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VOLUME XII.
NUMBER 5.

DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

MAY, 1881.

NEW YORK: Published at 5 and 7 Day St.

CHICAGO: 144 N. Clark Street.

Entered at the Post Office at New York, N. Y., as Mail Matter of the Second Class.

\$1.00 PER ANNUM.
SINGLE NUMBERS, TEN CENTS.

NEW YORK:		CHICAGO:	
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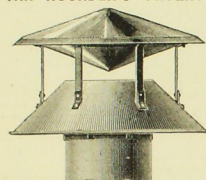
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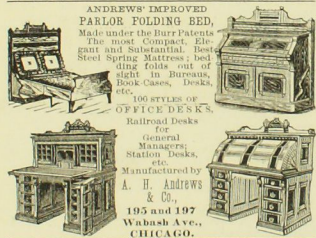
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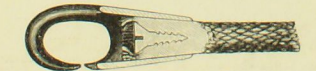
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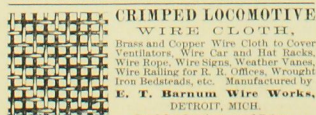
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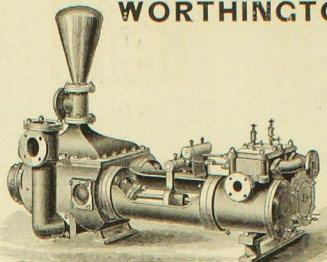
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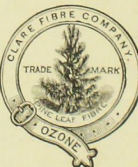
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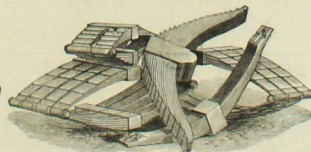
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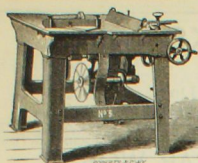
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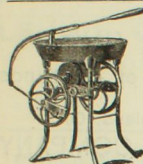
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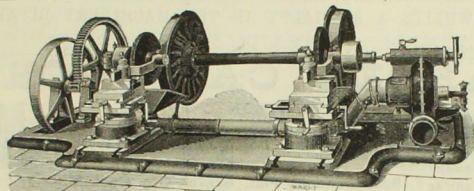
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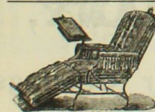
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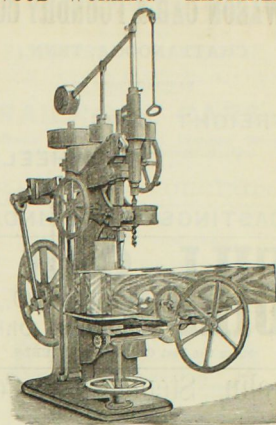
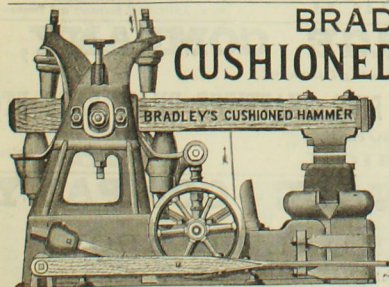
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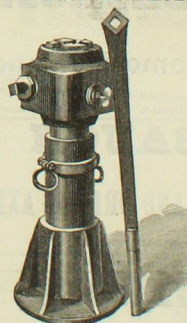
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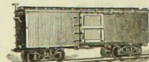
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[May 1881.]

MAY, 1881.]

THE NATIONAL CAR-BUILDER.

V

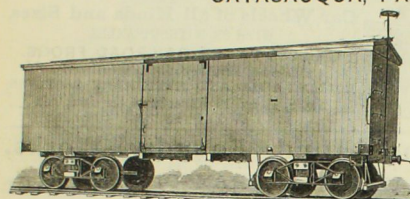
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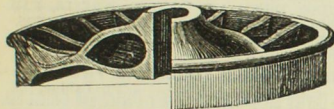
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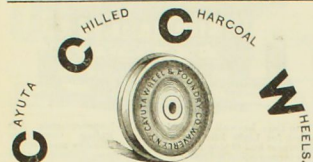
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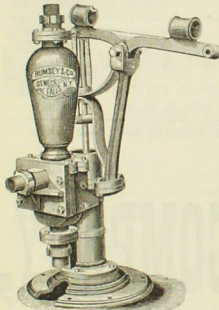
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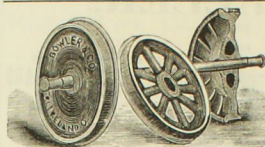

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Capacity 350 Wheels per day. Wheels made by improved process. Far more durable than those made in the ordinary way.



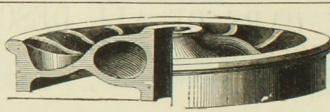
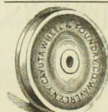
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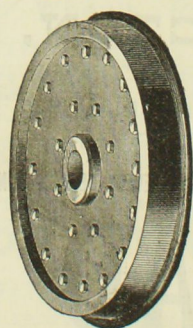
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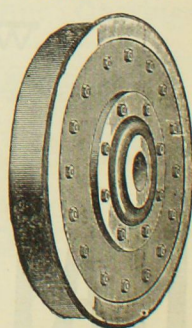
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 A. G. DARWIN, President.

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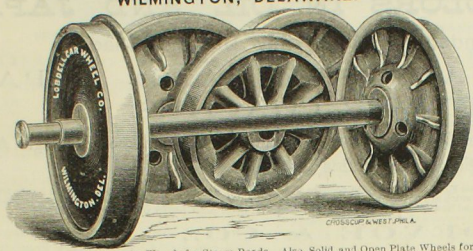
[May, 1881]

MAY, 1881.]

THE NATIONAL CAR-BUILDER.

vii

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PHILADELPHIA.
LOBDELL CAR WHEEL CO.,
WILMINGTON, DELAWARE.



Single and Double Plate and Hollow Spoke Wheels for Steam Roads. Also Solid and Open Plate Wheels for Street Roads. Wheels with Turned Threads, under the Patent of "W. W. Lobdell."

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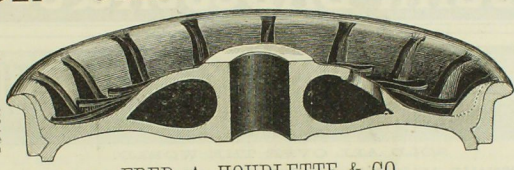
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VANDERBILT & HOPKINS,
RAILROAD TIES, CAR AND RAILROAD
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No. 120 Liberty St., New York.
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Lumber to Order.
GENERAL RAILROAD SUPPLIES.



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PLANISHED SHEET IRON
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Guaranteed fully equal, in all respects, to the
IMPORTED RUSSIA IRON,
And at a much less price.
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Our Specialty.
For sale by all the principal Metal Dealers in the large
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ALLSTON CAR WHEEL COMPANY.

We would respectfully call the attention
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"Washburn"
Pat. Homogeneous Metal-Tired
Car Wheels
Manufactured by this Company.



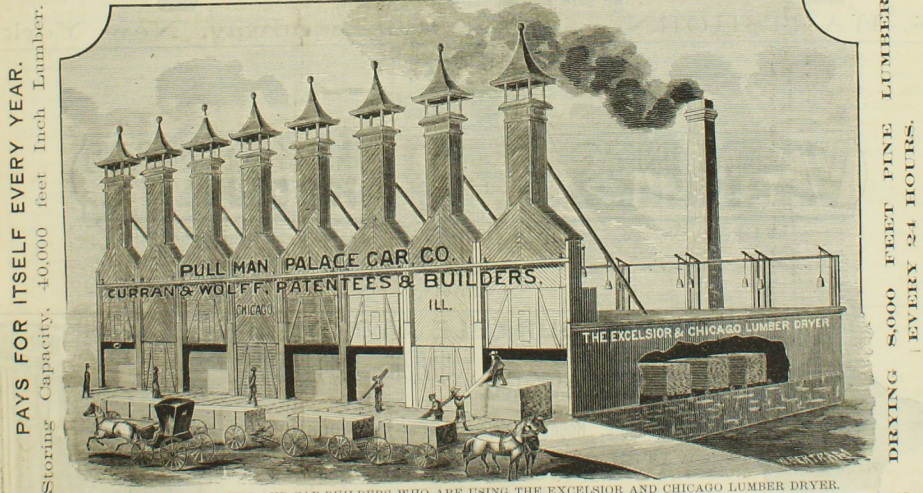
DURABILITY.—With these advantages
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the tenacity, hardness and durability of
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**DRYING 8,000 FEET PINE LUMBER
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Platt & Pike Marquette & L. Saginaw.....	1	Baswell & Barker Company, Michigan City, Ind.....	1
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COACH AND CAR COLORS IN OIL AND JAPAN.

Special Colors Compounded to Match any Desired Shade.

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Railroad Companies will save themselves great trouble in painting by allowing F. W. Devoe & Co. to prepare their Passenger and Freight Car Colors. This will insure DURABILITY, UNIFORMITY and ECONOMY. As we manufacture from the crude materials, which are the component parts of any shade, we understand better their chemical relationship, when in combination, than can be possible to those who simply buy their dry materials and then grind them. SEND FOR CATALOGUES AND LISTS OF SAMPLE COLORS.

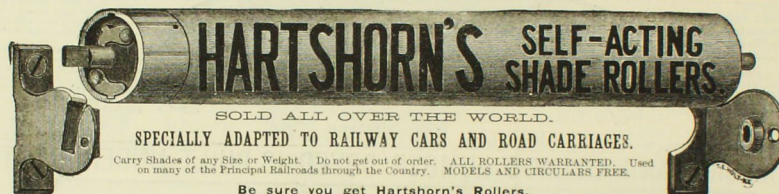
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JOHN BABCOCK & CO

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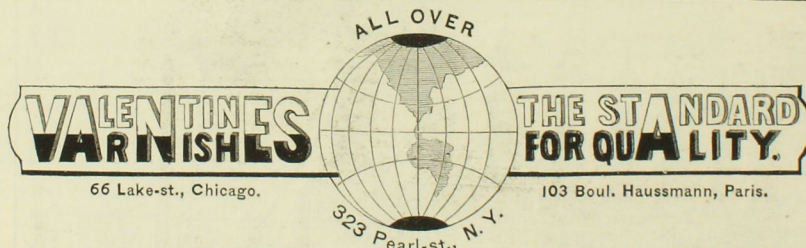
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Carry Shades of any Size or Weight. Do not get out of order. ALL ROLLERS WARRANTED. Used on many of the Principal Railroads through the Country. MODELS AND CIRCULARS FREE.

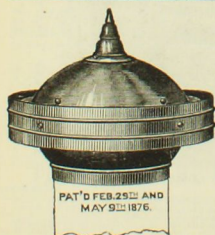
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PAT'D FEB. 25 1876
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SIMPLE, DURABLE AND CHEAP.

GLOBE VENTILATORS,

For Ventilation of
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WATER CLOSETS.

Twenty-five Sizes, from 2 in. to 48 in. inclusive.

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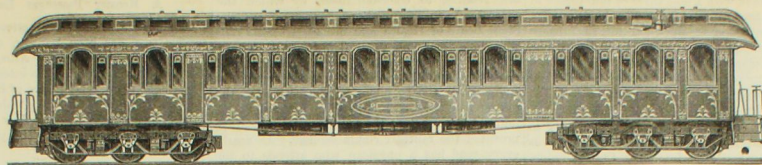
Catalogue and Price-List Furnished on Application.

GLOBE DEFLECTORS,

FOR
PREVENTING DUST OR CIN-
DERS FROM ENTER-
ING CARS.

[May, 1881.

THE NATIONAL CAR-BUILDER.



DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

VOLUME XL;
NUMBER 5

MAY, 1881.

(SINGLE NUMBERS, TEN CENTS,
\$1.00 PER ANNUM.)

Miscellaneous Items.

It is thought that trains will be running from the Rio Grande to the City of Mexico within two years.

The proposed adoption of the cable system for the propulsion of street cars in Chicago has been abandoned.

P. M. JONES & Co., of Schenectady, N. Y., are building 50 cars for the Brooklyn City Railroad Co.

The Pullman Palace Car Co. is building at its Detroit shops a handsome private car for President H. J. Jewett, of the New York Lake Erie & Western.

The New York, Pennsylvania & Ohio shops, at Meadville, Pa., in a few months past have changed 878 cars from 6 ft. to standard gauge, and have built 100 new box cars.

The Pittsburg, Cincinnati & St. Louis road has purchased the right to use Flagg's patent safety-gate, and will put them in service at all the most exposed street crossings in cities and towns on the line.

A car wheel works, with a capital stock of \$100,000, is the latest addition to the manufacturing industries of Indianapolis now talked of. The new company propose to be ready for business by the 1st of June.

FLEMING & SOSS, at St. John, N. B., have turned out seven of an order of nine freight locomotives for the Intercolonial road. They have taken another contract to build seven passenger engines for the same road.

MR. LUCE, of Detroit, has invented an iron passenger car on a new plan, and proposes to build one for trial, which is to be 82 ft. long, with seats for 100 passengers. He claims that it will weigh the same as an ordinary wooden car with 60 seats.

The Chicago offices and warehouses of Miller, Metcalf & Parkin (Crescent Steel Works) and Metcalf, Paul & Co. (Verona Tool Works) have been removed from 40 Dearborn street to Jones & Laughlin's new building, 22 West Lake street.

The Boston & Providence R. R. is having four new passenger coaches and three locomotives built. Two of the latter will be thirty-five tons in weight, and the third will be thirty-six tons, and will be used on the ten o'clock express to Providence.

The Jackson & Sharp Co., of Wilmington, Del., have added five acres of ground to their works, on which they have built several new shops. Additions have been made to others, and a new Corliss engine and two new boilers put in. They have put 200 extra employees at work.

MR. R. C. BLACKALL, Superintendent of Machinery of the Delaware & Hudson Canal Co., on account of the frequent breaking of main and connecting rods of his engines during the past winter, proposes to use rods made of Krupp's crucible steel.

THE Ramapo Wheel & Foundry Co. is full of work, having wheel contracts for months ahead, and also for 250 tons of Congdon brake shoes. It is also narrow-gauging a large number of coal, tank and other cars for the New York, Lake Erie & Western. The works are soon to be enlarged by the erection of a new machine shop and an additional foundry.

THE Mason Machine Works, of Taunton, Mass., are building an addition to their blacksmith shop, and erecting another large two-story shop in order to enlarge their capacity for building locomotives.

A RAILROAD journal says that 10,000 brakemen were killed in the United States in 1880. In spite of this fact, 10,000 men are always waiting for a vacancy.

THE Tanite Company, of Stroudsburg, Monroe County, Pa., owing to the increasing demand for its emery wheels and grinding machinery, has perfected plans for enlarging its already extensive works by the erection of a building 24x64, and four stories high; but owing to the lateness of the season, a building 24x32 will now be erected, and enlarged to the original design at a later period.

THE Industrial Works, Bay City, Michigan, are building their improved steam shovel and derrick cars for the Michigan Central, Providence & Worcester, Minneapolis & St. Louis, and New York & New England roads. A second order has just been filled for the Chicago & West Michigan, upon which one of the cars has been in use for more than a year.

A MANUFACTURER whose business requires the use of large amounts of emery, affirms that he has obtained good results from the use of ashes as a substitute for the finer grades. He saturates the ashes with water, the liquid being poured off after standing an hour or two, then poured off again, and so until he obtains several grades, down to a substitute for emery-flour. When dried, the deposit cuts readily and leaves a satisfactory surface.

AN extremely useful device, the invention of Mr. A. A. Faunce, of the Fitchburg R. R., has been placed over the clock in the Boston station. It is an automatic bulletin, which exhibits the telegraphic reports of all western and northern trains, tells the time they are due, and, if late, the number of hours or minutes. All questions relative to trains asked by patrons are answered by a glance at the bulletin.

ON April 7, freight cars were sent on the New York Central, from Rochester, as follows: 2,054 cars in 52 trains, east; 1,994 cars in 46 trains, west; making a total of 4,048 cars and 98 trains, or an average of nearly 42 cars to a train. During last year 640,328 cars went east from the same point, and 652,528 west, making a total of 1,292,856, and 27,508 trains, or an average of about 75 trains of 47 cars a day, 31 of which were loaded cars and 16 empty.

MR. JAMES BUCHANAN, Master Mechanic of the Syracuse, Binghamton & New York road, has been using steel axles for coach, tender and loco-

motive trucks for the past three years, with no trouble from heating, cutting or breakage. But whether they are liable to crystallize and give future trouble can only be determined by longer service. They are made by the Nashua Steel & Iron Works. He is also using main and connecting rods made at the same place.

THE Rochester & Pittsburg road is having considerable new equipment built, including four 8-wheel locomotives, four first-class passenger coaches and 225 freight cars of various kinds. The engines are being built by the Brooks Locomotive Works, the coaches by the Wason Co., and the freight cars by the Lafayette and Ohio Falls Car Companies. The road is also laying down 3,000 tons of steel, and 1,300 tons of iron rails, 120,000 ties, and rebuilding its bridges.

It is said that the engravers and watchmakers of Germany harden their tools in sealing wax. The tool is heated to whiteness and plunged into wax, withdrawn after an instant and plunged in again, the process being repeated until the steel is too cold to enter the wax. The steel is said to become, after this process, almost as hard as the diamond, and when touched with a little oil or turpentine, the tools are excellent for engraving, and also for piercing the hardest metals.

AN ingenious machine, called the "tell-tale," has been introduced recently on the Erie railroad. It registers the speed of trains, when and where they stop, and how long. It is used especially for freight trains, and is fastened at either end of small cabooses or at the side of large cabooses, about four and a half feet from the floor. It was adopted because freight trains frequently exceeded the prescribed rate of speed. They would run very fast for some distances, and then take things comfortably for a time.

THE New York, Lake Erie & Western road is about to erect new shops at Hornellsville, N. Y., including a machine and erecting shop 470x110 feet, a boiler shop 155x80, a blacksmith shop 155x70, a shop for light repairs 100x64, and a number of subordinate structures. The round-house will be 316 feet in diameter, and will have 44 stalls connected with a large turn-table. The specifications call for solid foundations, brick walls trimmed with cut stone, slate roof supported by iron trusses, and heavy oaken floors.

A NEW invention is reported from Turin. It consists in the application of light-giving materials to printing ink, by which print becomes luminous in the dark, so that in future it will be possible to read without the assistance of candle or lamp. A new daily paper, it is said, will soon be started in that city, upon which the luminous ink will be used. What a nice thing for railway cars running out of large cities on winter evenings. Every body reading his paper and lighting up the car at the same time. The more papers the more light.

The following method is recommended to prevent a locomotive from cooling rapidly after the fire is dumped: Make a hood cover for the top of

the smoke-stack with a hole three or four inches in diameter in the center. After the engine is put up, place the board over the stack and close the furnace door and dampers. In a round-house where this method is followed, an engine that had her fire dumped Saturday night was found to be so hot on Monday morning that a man could not walk the flues in the fire-box.

In a paper on railroad progress contributed to the Cleveland Engineer's Club, of which he is President, General Superintendent Charles Paine, of the Lake Shore road, thus spoke of the Fontaine locomotive: "Mr. Fontaine has attempted a high-speed locomotive by mounting one pair of drivers over the other pair to propel them by friction; he can doubtless run fast without a load; to draw a load he must have adhesion; to have enough adhesion he must concentrate the load carried by the four drivers of ordinary locomotives upon his two, which is fatal to his scheme, as I believe."

THE New York, Lake Erie & Western road is building at its Buffalo shops 6 baggage cars 48 feet long, 9 ft. 10 in. wide, and 10 ft. 3 in. from bottom of sill to top of clear-story. They have but one door on a side. The side braces and tie-rods, beginning at the bolsters, are graduated and made smaller in size toward the center, in accordance with the principles of bridge construction. The cars are intended to carry 30 tons, with a margin of safety equal to what is usually allowed in bridges. They have Miller platforms and Westinghouse automatic brakes.

MR. W. WAGNER, President of the Wagner Sleeping Car Co., has devised and patented a new berth-lock, which is being used in all new cars and in reconstructed old ones. The old spring-lock would not fasten, and when the berth was down, the bolt of the lock would not permit the head-boards to be removed without injury. The new lock is also a spring-lock, but it can be fastened when the bolt is drawn in by a movement of the handle, and it can be opened from the inside when the berth is closed, which is not the case with the old one.

MR. JOSHUA ROSE, a well-known mechanical writer, explains that the tendency of a nut to unwind and recede from the pressure upon its radial face is proportionate to the pitch of the thread and the diameter of the bolt; and the finer the thread upon a given diameter of bolt, or the larger the diameter of bolt with a given pitch of thread, the less will be the tendency of the nut to move back. In the case of ordinary bolts and nuts, a given diameter of bolt is given a standard pitch of thread, and these pitches are not so fine as to prevent the nuts from unscrewing in many cases, unless check nuts are used. It would be otherwise if the nut-thread fitted reasonably tight upon the bolt; for if the nut is screwed well home, it should remain there.

THE United States Rolling Stock Co. reports 23 locomotives, 1 baggage car and 4,833 freight cars as owned by the company December 31, 1880, which shows a decrease of 51 locomotives, 61 passenger and baggage cars, and an increase of 313 freight cars, as compared with the previous year. The total expenditures of the mechanical department during 1880 were \$730,614, mostly for new construction and repairs to rolling stock, the new cars built consisting of 680 box, 136 gondolas and 14 stock cars; 26 locomotives have been rebuilt or thoroughly overhauled, 3,343 wheels have been put under cars, tenders and engines, and 1,346 freight cars of different kinds have been narrow gauged. The net income for 1880 was \$248,234, out of which an interim dividend of \$97,000 was paid on the 1st of September last.

THE Railroad Committee of the Connecticut Legislature has agreed upon a modification of the

law relating to color-blindness, by which the control of the examinations is taken from the State Board of Health and intrusted to the railway companies and the railway commissioners, jointly. It provides that each company shall have a separate board of three examiners, to be composed of the president (or the secretary), the master mechanic, and a physician in good standing, to be selected by the company, subject to approval of the railroad commissioners. As nearly every road has a physician who attends to the employees, he will, as a rule, be selected to serve on the board. The men at present employed need not be examined, but only those hereafter taken into the service of the companies. The method of examination is to be fixed by each board of examiners.

MR. W. H. PAIGE, of Chicopee, Mass., and for many years past superintendent of the Wason Manufacturing Co., has resigned his position, and will hereafter devote himself to the manufacture of Paige's wrought metal car wheels, of which he is the inventor. These wheels have a heavy steel tire which is put on without heating, or rather, the two wrought side plates are forced into the tire by hydraulic pressure, and also on the hub at the same time. The metal of the tire is then turned down over the plates, and the plates are also securely bolted to the tire flange and to the hub, with no filling between. The weight of these wheels is said to be much less than that of corresponding sizes of chilled wheels, and they have given great satisfaction on the Connecticut River road and elsewhere. The wheels will be manufactured by the Paige Wrought Metal Car Wheel Co., at Springfield, Mass.

THE Columbia Car Spring Co., of New York, have recently enlarged their works by putting in an elliptic spring plant with the latest improvements, which will be in full operation by the first of May. These springs will be made of the best crucible steel, and warranted equal to any in the market.

THE Eastern Car Trace Association, which now includes twenty-four roads and receives 685 daily reports, has its headquarters in Buffalo, and is about to establish an office in Chicago. It is designed to assist car accountants in their work and to give each road a report every two days, showing the location of their cars off the line of their road.

WORK on the new passenger depot of the Boston & Albany R. R., at Boston, is being pushed rapidly, and the walls are nearly completed. Carpenters will begin working night and day in a few days, and it is expected that all the wood-work will be done in ten weeks after they begin.

THE seventh annual convention of the Yard-Masters' Mutual Benefit Association will be held at Milwaukee, Wis., the first Wednesday in June. Interest in this excellent organization is growing from year to year among the yard-masters of the country, as the knowledge of its objects and work becomes more and more diffused, and the result is shown in a constantly increasing membership.

THE Shaw double-cylinder locomotive, recently built by the Hinkley Locomotive Co., in Boston, is now on trial on the Boston & Providence road. It has been running local trains between Boston and Readville, and on April 7 took an express train from Boston to Providence, making the run of 44 miles in 58 minutes.

THE New York, Ontario & Western road is building at its Oswego shops six 30-foot gondola or flat cars a week. It is also removing six-wheel trucks from its drawing room and sleeping cars, and putting four-wheel trucks with six-foot wheel base in their place. The shops employ 130 men.

A Monster Passenger Locomotive.

One of the largest locomotives for passenger service that has been built in this country has just been completed at the Altoona shops of the Pennsylvania Railroad. It is intended to be an improvement upon recent ones of its class designed for fast running with heavy trains, and is of the usual American type, with four driving wheels and a four-wheeled truck. The principal dimensions are as follows:

Diameter of driving wheels.....	6 ft. 6 in.
Diameter of truck wheels.....	2 " 9 "
Total wheel base.....	19 " 5 "
Wheel base of drivers.....	7 " 9 "
Wheel base of truck.....	6 " 6 "
Dimensions of cylinders.....	18 x 24 "
Smallest outside diameter of boiler.....	50 "
Number of tubes (1½ inch).....	201
Length of tubes.....	10 ft. 11½ in.
Size of grate.....	10 ft. x 41½ "
Heating surface in fire box.....	125 sq. ft.
Heating surface in tubes.....	1,080 "
Diameter of driving axles.....	8 in.
Length of journals.....	10½ "
Width of exhaust ports.....	3½ "
Maximum travel of valve.....	5½ "
Diameter of chimney.....	18 "
Height of chimney above track.....	15 ft.
Total weight in working order.....	92,700 lbs.
Weight on drivers.....	65,300 "

The engine has Westinghouse driving wheel brakes. The fire or heating surface is largely increased over that of ordinary engines by extending the fire box to the full width between the tires, and placing the springs and equalizing levers below the frame. Instead of the ordinary lever, the engine is worked with a steam reversing gear, the lever of which is placed just beneath the air brake lever in front of the engineer's seat. The dome is covered with a wrought iron casing without moldings. In its general appearance the engine is quite devoid of ornament. The boiler is so high that the chimney had to be shortened in order to get through the bridges and tunnels. The cab is a square box, and the rods, keys, pins, etc., are of the plainest description. On her experimental trip between Huntingdon and Altoona, a 34-mile stretch and an up-grade, she made one mile in 57 seconds, and another in 58 seconds, every thing running cool. She is to run on the fast extra heavy morning and evening trains between New York and Philadelphia. Her behavior has thus far been so satisfactory that the company has decided to build eight more of the same kind.

Railroad Conventions.

May 17.—Railway Purchasing Agents' Association, St. Louis, Mo.

May 25.—Car Accountants' Association, at Grand Hotel, Cincinnati.

June 14.—Master Mechanics' Association, Providence, R. I., at Narragansett Hotel.

June 14.—Master Car-Builders' Association, New York City.

He had just taken his seat in the street car, in fact had hardly got fairly down, when a lady entered. He immediately rose. "Don't rise, sir; I beg of you, don't!" she said. "Good Heavens, ma'am," he yelled, "I must! There's a pin three inches long set up on that seat!" She made no further objection to his rising.

It was in the smoking-room of an Atlantic steamer that a worthy Teuton was recently talking about weather forecasts. "Look here," said he, "I tell you vat it is. You petter don't dake no stook in dem weadder bredictions. Dose beoble don't know noding. Dey can't dell no petter as I can." "But, my dear sir," said a person present, "they foretold the storm which we have just encountered." "Vell, dat ish zo," said the Teuton contemptuously; "but I tell you vat it is. Dat storm would have come just de same if it had not been bredicted."

PASSENGER CAR SIDE TRUSSING.

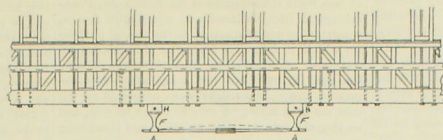


Fig. 1.

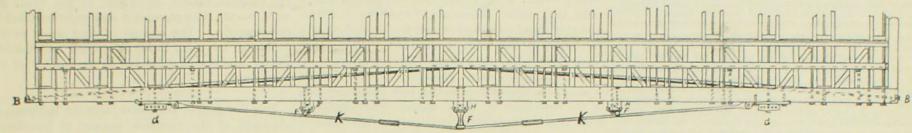


Fig. 2.

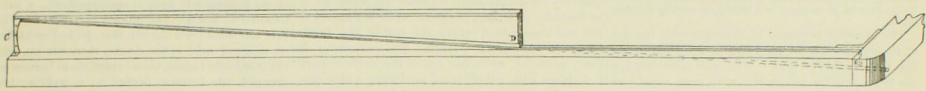


Fig. 3.



Fig. 4.

The drawings represented in the cuts have been sent us by a practical car-builder who has given special attention to the methods of framing and trussing passenger car bodies. He is of the opinion that the prevailing practice in these respects can be improved upon, as shown in the following explanation of the engravings:

Fig. 1 represents the middle portion of the side frame of a passenger car below the belt rail, with the cross-frame tie timbers *H H*, the body queen posts *F F*, and the truss-rod, in their respective positions as they are usually placed. With this arrangement, it is claimed that the truss-rod between the points *A A*, has no trussing power except from horizontal tension, and that a vibratory motion, indicated by the curved dotted line, is thereby imparted to the car body, causing discomfort to the occupants.

Fig. 2 shows what is considered a better method of construction. The truss rod *K K*, instead of running over the body bolsters *G G* and through the end sills, is placed under the side sill, and extends only to the bolsters, as shown. There are also three cross frame tie timbers *H H H* instead of two, with a long queen post in the center, so as to make the trussing power of the rod effective through its entire length. A counter truss-rod *B B* (3/4-inch) is also introduced, extending from the end sills upward to the center at panel rail, the effect of which is to prevent vibration, give greater rigidity to the car side, and obviate any tendency to sag. This rod is gained into the truss plank as shown in Fig. 3, the groove or channel being gradually widened until it reaches the side sill at *D*, where there should be 3/4 of an inch clearance above the rod, so as to permit a free adjustment of the car body when the rod is tightened up.

Fig. 4 is a sectional view of the framing of side sill, truss plank, and window posts, through *E*, Fig. 3.

The Wagner Sleeping Car Co. has just put on the track two new cars built by the Harlan & Hollingsworth Co., and named "Canajoharie" and "Canonius." Six more cars are being built by the same company; also four by the Gilbert & Bush Co., and six by the Barney & Smith Co.

Automatic Car Couplers.

A correspondent of the *Railway Age* enumerates the following requirements for a complete automatic coupler, as being the result of a prolonged study of the problem, and the examination of many models:

1. All parts necessary to its working must be fast.
2. The couplers on both ends of a car must be alike.
3. It should admit of being coupled to all present forms of couplers, without any increase of danger to the brakeman.
4. It must couple automatically with its own kind.
5. From all kinds of couplings it should be uncoupled as easily as the common ones are now.
6. With its own kind it must uncouple from the outside of the car, and the coupling and uncoupling parts must automatically readjust themselves so that cars can be again coupled without any inspection.
7. It must work on curves without uncoupling or breaking.
8. It should allow great variation in the height of cars; it must allow at least four inches.
9. It should require no change in the attachment to cars.
10. It should require no extra springs.
11. It should act as its own buffer.
12. It should admit of the use of cast metal.
13. It should not break on striking stubbing-block.
14. It should be in such shape as to be repaired easily.
15. It should keep the cars close together.
16. It should be light, strong, cheap and durable.
17. In short, it must always be effective, never uncoupling except at the will of the brakeman; and always coupling with the desire and action of the engineer.

The writer also says: "The fundamental principle of an automatic coupler is that all parts must be fast or secure, for if they are not fastened they are liable to be either lost, mislaid or stolen, and would not then be in place when the cars came together, in which case the coupling could not be made without getting other pieces, and nothing that will not surely work without the constant attention, supervision and adjustment by a man can be classed as automatic. In addition to all parts being fast, the draw heads in both ends of the car must be alike and have the complete mechanism for coupling for, otherwise, if the draw head at one end had a fast link and the other

end did not, then if one car should go around a *V* switch, turning itself, the opposite draw heads, having either two fast links or two draw heads with no link, would come together, and if this had not been arranged for and each draw head made complete in all its parts, no coupling would be effected. As the difference in height between a new empty and an old loaded car of the same kind is often four inches, the automatic draw head must be ready to couple to those of its own kind at that height, as soon as they come together, without any previous assistance or adjustment from the brakeman; for if they require assistance they are not automatic. From this we see that the 1st, 3d, 4th, 6th, 7th, 8th and 17th of these requirements must be fulfilled by any draw head that is an automatic coupler, and that the 3d, 5th, 9th and 10th will probably be necessary to its adoption, while the remainder are all desirable and almost necessary to success."

[These specifications seem to cover the whole ground, while they also indicate how extremely difficult it is to devise a coupler that will meet all the conditions, or even the major part of them. All that is attainable in the direction of a perfect automatic coupler is an approximation to the ideal standard, unless, indeed, the inescapable metal of which it is composed can in some way be endued with intelligence. In such case, however, the contrivance would not be automatic, and the absence of that most indispensable feature would be a fatal defect. A car coupler that will do or not do everything in the programme of its usefulness, as circumstances may require, has got to have more brains than an average train-man to begin with; and must also never get tired, nor color-blind, nor sleepy nor hungry. This is really a little too much to expect of steel or iron, and therefore it would seem that the great array of inventors who are wrestling with the problem had better draw a line somewhere between the attainable and the impracticable, and work on that side of it upon which time and labor are not utterly thrown away.—ED. CAR-BUILDER.]

MR. L. PACKARD, Master Car-BUILDER of the New York, New Haven & Hartford road, at Hartford, Conn., has resigned his position to take a similar one on the Baltimore & Ohio road, at Baltimore, Md.

The Stevens Locomotive.

We are indebted to the *Railroad Gazette* for the engravings and description of this very peculiar engine. The boiler is a square box, extending from the back end of furnace to front end of combustion chamber. It is about 6 feet wide and 2 inches deep, with stay-bolts running through and through each way. There are 530 tubes, 3 inches in diameter, and varying from 2 to 3 feet in length, screwed into bottom of boiler. The inventor, Mr. Frank M. Stevens, of Concord, N. H., says in his patent specification:

"This invention has for its object, among other things, a novel construction and arrangement of the different parts that together constitute a locomotive engine, and also to economize fuel, and prevent sparks, cinders and excessive smoke. One part of my invention consists in a locomotive having a boiler or steam-generator arranged at the rear of the bogie truck, above the driving-wheels, the said boiler having at its rear end an apartment for the fireman, and at its front end an apartment or housing-cab for the engineer, the said engineer's apartment containing the valve-gear and valve-controlling mechanism, all as hereinafter set forth, whereby the engineer is placed at the front of the locomotive, where his view of the track and signals is entirely unobstructed, where he is removed from the presence of smoke, steam and dust, and has all the mechanism for starting, stopping and reversing the locomotive completely under his control. This construction affords additional security to the lives of passengers and safety of rapidly moving trains."

The inventor proposed to dispense with the use of the steam blast for stimulating the draft in the fire. To do this he says "it became necessary for me to provide the locomotive with more rapid and efficient means for generating steam." Fig. 1 is a longitudinal section of the engine, from which it will be seen that the boiler consists of a fire-box, *P*, and combustion chamber, *E*, which, with the former, extends the whole length of the boiler, and both are lined with fire-brick throughout. The boiler proper consists of what may be called a flattened cylinder or shell, *D*, whose form is that of a condensed letter, *o*, and which is supported in the top of the walls of the fire-box and combustion

A New Officers' Car.

A new car of this class has just been completed at the Kent (Ohio) shops of the New York, Pennsylvania & Ohio Railroad, and which in its design, construction and adaptation to the special purpose for which it intended, is worthy of a detailed description. A broad gauge officers' car was built by the road in 1876, but not being adapted to the present gauge, the trucks were narrowed for the new car at a saving of over \$2,000 in its cost, and leaving the actual cost of building and furnishing the car complete, exclusive of trucks, at \$9,000.

The number of the car is "202;" length of body, 54 ft.; width, 9 ft. 1 in.; extreme height above rails, 13 ft. 10 in. There are 16 windows on a side, and the usual end windows all double-sash except the half-way and kitchen windows. Both sashes have 35x30½ in. plate glass. The top ones are elliptic, with ornamental glass 25x9. The outside is similar in appearance to the best passenger cars of the road built at these shops. The platforms have iron railings with three gates. The interior finish is a combination of Corinthian, Doric and Gothic; the carving, of which there is a moderate quantity on the pilasters between the windows, is in Eastlake style, and the panel work is finished in ash and walnut-burl veneer, the rest of the finish being in American walnut. The veneering is finely polished, while the rest of the surface work is finished with a shell gloss, producing a rich contrast. The pilaster carvings and fluted work are finished in ebony and gold.

At one end of the car is a parlor with a movable bed-case in the left-hand corner, over which is a large mirror. From this room there is a passage way on the right-hand side running through to the smoking room at the opposite end of the car. Adjoining the parlor is a state room with upper and lower berths in the Pullman style, and then a saloon and wash-room, linen closets, etc.

Eastlake style, in gold and color, and confined mostly to the borders, leaving the central portions perfectly plain. The lighting is by center and side lamps—22 burners in all. The outside of the car is painted a dark chocolate, which is the standard color of the passenger cars of the road, and ornamented entirely in gold, and in the flat or Eastlake style. The trucks and steps are a dark orange, relieved with striping. Six-wheel trucks and Allen paper wheels are used; also Miller platforms and couplers, Westinghouse automatic brake, and a Wythe speed recorder.

The car is highly satisfactory to the officers of the company, and is in every respect creditable to the assistant master car-builder of the road, Mr. S. V. Smith, who planned it and superintended its construction. The charge of the car is in the hands of Mr. John Purdy, the tried and faithful porter, and one of the oldest in the employ of the company.

But few people are aware, says the *Indianapolis Journal*, of the immense amount of handling it requires to convert an old iron rail into a new one. From the time it arrives in the yard at the Indianapolis Rolling Mill until it is shipped out, a rail is handled 31 times. The process is as follows: It is first unloaded from the car, then picked up and run on a set of rolls to the shears, then cut up, when cut piled into fagots, then loaded on to barrow and charged into furnace, heated to a welding heat, then hauled out and placed on iron buggies, run to weighing rolls, handled six times, until finished to a bloom, then returned to a reheating furnace, brought to a welding heat, then returned to the rolls on a buggy, passed through the rolls 9 times, then run to saws where both ends are cut off at once, then laid on the cooling-bed; when cold, placed under the straightener, which takes out all minor crooks. The burr on the ends is then filed off, when the rail is inspected, then taken to the

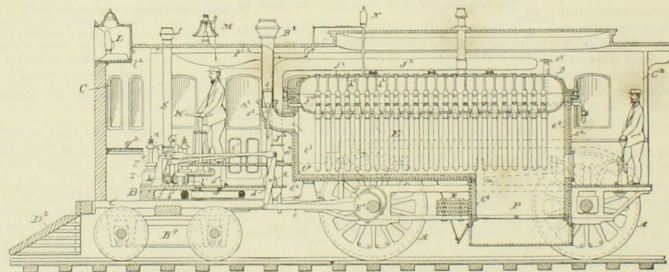


Fig. 1.

THE STEVENS LOCOMOTIVE.

chamber. From this shell are dependent circulating tubes, *E*, extending downward into the fire-span. A section of one of these on an enlarged scale is given by fig. 2. The direction of the circulation of the water in these tubes is shown by the darts. The top and bottom plates of the boiler shell are stayed to each other by the outer tube, which is screwed into the bottom plate, and the bolt *h*², which is screwed into the top plate and into the projection *F*² of the outer tube.

The valve-gear is very complicated, and only elaborate illustrations and descriptions would make its construction clear.

"The front of the structure is made V-shaped, to divide the opposing body of air in the manner of a vessel dividing the water, and thus lessen the power required to drive the locomotive."

"Removable weights, *R*, are provided, by which the pressure of the drivers on the track may be varied at pleasure."

There is also a private state room fitted up with a large bed-case closing partially in an arch with a large mirror over it. Kitchen is provided with a range, wash sink, dish-closets, and all needful appliances. The smoking-room has a sofa extending the full length of the room on one side, while on the other side are a cylinder writing-desk and easy chairs. In each state room is a transom-sash in addition to those in the clear-story. The dome finish is Gothic, the roof a segment arch, the windows have damask spring-roller shades, and the floor is lined with Wilton carpet. Electric annunciators for communicating with the porter are provided for each room, and also at the outside of the car at each end.

The head-lining is heavy sheeting, with a dark but warmly-tinted ground harmonizing with the wood-work. The decorative treatment is in the

punching machine and fitted for splice bars, thence to the slotting machine, where it is slotted for the spikes; then the rail goes on the benches in the yards and from them to the cars.

The Boston & Albany Railroad Co. commenced using the Washburn steel-tired car-wheels about ten years ago. On Jan. 1, 1881, there were 9,100 in service under their passenger train cars, and all in good order. From this number, 666 wheels that have run the longest have been selected for the purpose of estimating the average mileage, which is found to be 215,378 miles. The whole number put in service from the beginning is about 2,300, of which about 250 have been removed. The average mileage of the whole number put under cars up to the above date is about 146,000 miles.

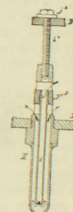
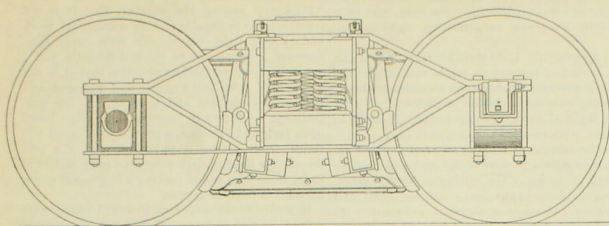
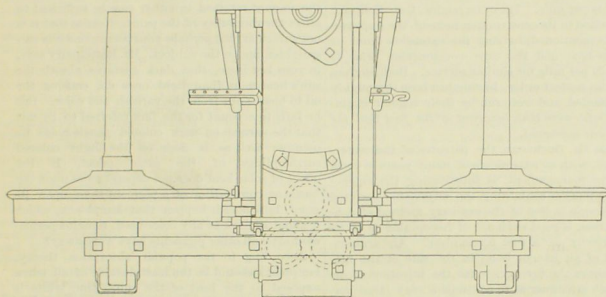


Fig. 2.

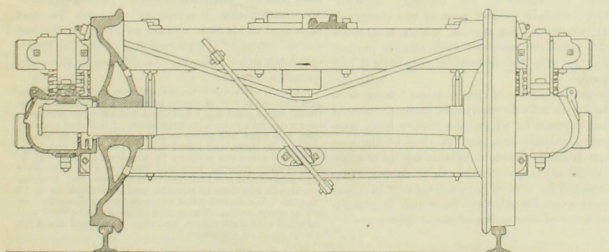
STANDARD FREIGHT CAR TRUCK—LOUISVILLE & NASHVILLE RAILROAD.



Side Elevation.



Half Plan.



End Elevation and Section.

SPECIFICATIONS.

Distance between centers of axles.....	5 ft 1 in.
Distance between centers of journals....	6 " 3 "
Between centers of oil box holes.....	6 1/2 "
Between centers of column bolts.....	1 " 4 "
Height of column.....	1 " 4 1/2 "
Journals.....	3 1/2 " x 7 "
Wheel seat of axle.....	4 1/2 " x 9 "
Diameter of axle at center.....	4 "

Top bolsters, finished size, 7 3/4 x 14 in. x 7 ft. 7 in. long; bottom bolsters, 5 1/4 x 14 in. x 7 ft. 7 in. long, all of best quality of white oak. Each top bolster to rest on three nest spiral springs 7 in. high, set in trouble spring pockets, each group of springs to have a capacity of 30,000 when exhausted. Bolsters to be trussed with two rods of 1-in. charcoal iron. Brake beams of white oak, 4 in. thick, 7 in. wide at center, and tapering to 4 in. wide at ends. Brakes to be hung

between the wheels. Brasses 9 parts copper to one of tin, and to weigh, after being lined, not less than 12 1/4 lbs.

Axles of best quality hammered scrap, no shoulder back of wheel seat; to be tested by being placed on supports 3 feet apart, and struck three times in center by a 1,500-pound drop falling 10 feet, the axle being reversed after each blow. Wheels to be standard road pattern, hub, 7 in. deep, and to weigh not less than 515 lbs., and guaranteed for two years. Wheels and castings for two trucks, including brasses to weigh, as per estimate, 5,496 lbs.

THE Alabama Great Southern road has commenced a complete reconstruction of its shops in Chattanooga, and is making valuable improvements and extensive additions.

The New Pullman Car Works at Chicago.

The inauguration of this great enterprise at the new town of Pullman, some fourteen miles south of Chicago, took place on the 2nd of April, and was witnessed by a large number of prominent railroad men and others. The ground owned by the Pullman Palace Car Co. comprises 308 acres, upon which have been erected within the past year many of the factories and other buildings to be used in the construction and repairing of cars. In the immediate vicinity are also to be erected a large number of dwellings for the workmen, also stores, school houses, a market, a library building, hotel, depot, and other features of a great manufacturing town.

The car works when fully completed will consist of erecting shops with a frontage of 690 by 87 feet deep; a wood machine shop 200x300 feet, and three stories high; two freight shops, each 475x86 feet; a hammer shop 250x156 feet; a three story equipment shop 100 feet square; an immense foundry, dry-houses, and other buildings, including a gas-house 90x30 feet. The lumber yard covers a space of 500x1,000 feet.

The power is supplied by the great Corliss engine built for the centennial exhibition, and rated at 2,400 horse-power. The cylinder is 40 inches in diameter and 10 feet stroke, and the fly-wheel 30 feet in diameter and 2 feet face, and weighing 56 tons. The steam is supplied by 12 boilers 6 feet in diameter and 18 feet long. The engine house is 80x80 feet, and 60 feet in height, and the power is communicated from it to the other buildings by shafting running in stone tunnels.

Among other projected features, is the erection of an immense tower, 80 feet square at the base and 160 feet high, with a water tank of half a millions gallons capacity at the top. The foundation is 90 feet below the surface, and is already laid.

Contiguous to the car-works are the works of the Allen Paper Wheel Co., occupying an area of some five acres. The main buildings are 368x140 feet, and two stories high; the iron machine shop is 104x200 feet, and three stories high; and the blacksmith shop 127x200. Much of the machinery is already in place, and when it is in full operation the premises will be a hive of industry in supplying the important adjunct of paper wheels for the car rolling stock of the country.

The new town of Pullman is destined to become a great manufacturing center as well as a future monument to the enterprise of its founder. It is well laid out with streets and avenues 100 feet wide, shade trees have been planted, an artificial lake excavated, and small parks projected—everything, in fact, that a practical foresight and lavish expenditure can accomplish will be done to promote the comfort, health, happiness, and social advancement of those who are to be the future residents of this incipient city.

AN exchange says: In all manufacturing countries may be found scores of workmen who have but imperfectly learned their trade. They infest shops, bother employers and disgrace workmen. They are the vagrants of the trade. The country needs skilled workmen. It is only at rare intervals that business is so flat that skill is not in demand, but there are frequent periods of slackness when only skillful and reliable men are wanted. There is no royal road to the position of skilled workmen. It must be reached by the close, attentive, patient plodding of the apprentice through the lane of learning into the broad road of competent acquirement. The entire matter resolves itself into the plain, old-fashioned rule of sticking to a business. No looking back after the hand is placed to the plough. There is hard work and unpleasant work to be done; but it must be done, else the apprentice never becomes the workman. Serving one year, or two, is not sufficient.

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18 miles. The whole
he beginning is about
have been removed.
e whole number put
late is about 146,000

Communications.

Mystery of Boiler Explosions

To the Editor of the National Car-BUILDER:

It is, I believe, very generally admitted that practical observation and scientific research have thus far been unable to determine some of the specific causes of steam boiler explosions. All that is really known in regard to these occurrences is the fact that a power is generated inside of the boiler which its strength is not capable of resisting. In some instances, it is true, the cause is sufficiently obvious, while in others it is a mystery which no amount of theorizing can satisfactorily explain.

It is not my purpose to set forth any new theories, but simply to relate an incident that occurred some years ago in my own experience, and which impressed me with the conviction that a good deal is yet to be learned upon this subject. I was engaged at the time referred to in the round-house of an important railroad, in which was a small portable engine for running machinery engaged in round-house work. The engine was in charge of an apprentice, who also ran a small lathe for fitting bolts and doing other light work. His duties at the lathe frequently called him away from the engine, and upon one occasion, while thus employed, the steam ran down and the engine stopped on the center. I at once went to it, opened the fire-door, stirred the fire with the poker, threw in some coal, and stood waiting for the steam to start it again. The steam-gauge was directly before me, and, while thus waiting, the needle started all at once and traveled around the dial very fast. I turned the throttle wide open, stepped to the fly-wheel and threw it off the center, when the engine started and ran at a rapid rate. Upon glancing at the gauge I noticed that the needle was going back, but marked 110, the engine running, as near as I could judge, 150 revolutions per minute, but slowing down, and in less than a minute was again dead, and the needle back to 5. Steam, however, was soon raised, and the engine started again and ran as usual. I examined everything; the water was at its usual height; the fire-box and smoke-arch were in their usual condition, as well as every other part of the machine. The water used was from the Ohio River, and was at the time free from mud. The boiler had been thoroughly washed out once a week, and was in good condition.

This sudden development and equally sudden loss of power impressed me the more from the circumstance that the crown-sheets of two new engines of the company had just failed, and an investigation of the matter was then being made by a number of master mechanics. I had previous to this seen and examined many boilers that had exploded, the cause being apparent in some cases, and in others not. To my mind these explosions are in many cases due to unknown causes, and, so long as they remain unknown, such accidents are not preventable by human skill.

H. H.

Locomotive Fuel Economy.

To the Editor of the National Car-BUILDER:

As the subject of perfect combustion and economical coal consumption in the running of locomotives is receiving some attention in the columns of your journal, the following facts relative to the performance of certain engines of the New York, New Haven & Hartford Railroad, and to which reference is made by a correspondent in your April issue, may not be uninteresting to your readers.

The locomotive "Altair"—the one specially mentioned by your correspondent—is attached to the Boston Express, leaving Springfield at 11.35 A. M., and the Fast Express, leaving New Haven

at 6.12 P. M., each train averaging four regular passenger coaches, two drawing-room cars, one baggage and one postal car, making eight cars in all.

The speed of the 11.35 train averages 38 miles an hour, including three stops, while that of the return trip averages not less than 48 miles an hour, including two stops within a distance of 61½ miles, the coal consumption being 38½ pounds to the mile, with no allowance for switching.

For the purpose of making an accurate and reliable comparison relative to the coal consumption incident to the use of the Buchanan water-bridge, adjustable plate diaphragm, extension front and valve door, two engines, identical as to size with the "Altair," were substituted for that engine for one week; one of these, the "Arcturus," having all the improvements to be found in the "Altair," with the single exception of the water-bridge, performed the service with a coal consumption of 35 pounds per mile. The other engine, the "Eclipse," embodied in its construction none of the improvements mentioned, barring the extension front or smoke-box, and the coal consumption was 45 pounds per mile for similar service. Both engines were in perfect order, having just been thoroughly overhauled, and were run by their regular engineers, who were both ignorant of the fact that the coal was measured.

That Mr. Buchanan, the patentee of the water-bridge, with an experience of many years in locomotive management, is substituting the smoke-box extension containing the adjustable serrated diaphragm in lieu of the ordinary method of construction, is good evidence of his opinion as to its superiority as a fuel economizer. An arrangement of air jets, or holes in the side of the fire-box above the fire, serves for the injection of air in such a manner as to consume a very large percentage of the gases, thereby saving the power necessary for their ejection from the smoke-box. The smoke-box extension, with its adjustable serrated diaphragm, is eminently a blessing to travelers, statements to the contrary notwithstanding; while a greater part of the cinders is therein retained, that portion which is thrown from the stack has assumed such minute proportions as to give the passengers very little if any annoyance.

The performances of the "Altair" have been watched with a lively interest by many prominent railroad officials to whom the results have been eminently satisfactory, and in view of the economical features incident to the use of the improvements above mentioned, their adoption has been secured for several locomotives now in course of construction for other roads, which is gratifying evidence of the merits of these appliances.

S.

The Color-Line in Car Painting.

To the Editor of the National Car-BUILDER:

In response to the communication of "Buckeye" in your April number, I hasten to disclaim any reflections upon the Master Car Painters' Association, or upon its members individually, in what I said in your March issue in reference to light and dark colors for cars. I hold the Association in high esteem for what it has done in behalf of car painting, and especially for its efforts toward a more uniform system in working than has heretofore existed. So far as it has gone, its aim has been in the right direction; but when some of its prominent members assert that the durability of paint and the cost of applying it depend upon its color, they are saying what has not been proven by satisfactory evidence. I have not said a word in disparagement of light colors, as such, for I think I am as fully aware of their advantages and disadvantages as the majority of car painters are.

It is maintained by some painters, your correspondent "Buckeye" among the number, that it is not possible to do as durable and as economical work in dark as in light colors. My own experience, however, compels me to think differently, and I can only repeat my former assertion that it is not a matter of color, but a question of pigments and their proper selection and mixture. If the contrary can be shown by positive knowledge based upon facts and evidence, a great deal of good will result from giving it publicity. But if a preference for light or dark colors is a mere matter of taste, there is no use in making a bugbear of either in order to frighten people.

In regard to the solar heat theory, I agree with "Buckeye" when he says there is no question in his mind about dark surfaces absorbing heat and light ones reflecting it. But while admitting this, I would ask if light surfaces do not also absorb heat, more or less? the question being whether the amount retained in either case is sufficient to affect the durability of the paint. I claim that it is not sufficient; but perhaps your correspondents can enlighten me on the subject. Mr. Rattenbury says, in your last issue, that dark surfaces absorb the sun's heat more than light ones do, causing the oil to bleach out from the varnish and color. But he fails to account for the fact referred to by me, that the varnish on dark colored panels holds its own as well as it does on the light colored surroundings of the same panel. If the effect of solar heat does not depend more upon the basis or composition of a pigment than upon its color, how does it happen that lampblack, which is about as dark as any color used, remains permanent after all other pigments have worn away?

According to the popular absorption theory, lampblack should be the least durable of all when exposed to the heat of the sun. Zinc white is lighter in color than white lead, and consequently a cooler color, according to the theory. Why not use it then instead of lead? or, why not paint cars white instead of corn color, so as to absorb the least possible minimum of heat? The argument of Mr. Rattenbury, it seems to me, can be best answered in his own words, as given in the last annual report of the proceedings of the Car Painters' Association, page 21. In discussing the color question he said:

"I have had some little experience with dark colors, and I am in favor of them, because I have had to use them; but I must say I have had just about as good success with dark colors, as with light. I find that my varnish will wear just about as good on the dark color as it will on the light, and I find that it is easier to touch up. A light colored car is easier to touch up at first, but in two or three months how will the touching up look on it? I have had good success with dark colors. I never varnish in less than 12 months, and sometimes 14 or 15 months. We do not paint our cars in less than five or six or seven years. The company seems to be very well satisfied with dark colors, and they have used them for about eight or ten years."

This is such a very favorable endorsement of dark colors that I forbear dwelling further on the subject at present.

OCCASIONAL.

THE *Elevated Railroad Journal* says that the ten new cars built for the Metropolitan lines by the Pullman Palace Car Company, are magnificent specimens of artistic skill and excellent workmanship, and reflect credit on the builders. A light oaken grain ceiling decorated in the highest style of art relieved with darker woods, produces an effective contrast. Over the center seats and at the corners of the cars panels with various coats of arms add to the general effect. The seats and backs are of light rattan cane. The seats differ somewhat from former patterns in having springs, and presenting a light and airy appearance. The windows are of uniform size, with cream-colored blinds. A tasteful bell rope runs along the sides. Three chandeliers furnish brilliant light. The complimentary remarks from passengers show that they appreciate the new cars.

One of the Palace Cars.

The following description of a car that has just been completed for the Spread-Eagle Junction, Munchausenville & Primrose Valley Railroad, comes to us with the request that if we print it we must indorse every word it contains. Knowing as we do that the present age is a remarkably progressive one, we cheerfully accede to the request, although the details may prove a pretty severe strain upon the credulity of our readers. The description runs thus:

The "Mammoth Queen" has just received her finishing touches, and as she stands on the side-track ready for her trial trip, is beyond question the most wonderful traveling vehicle ever constructed on this planet. In size, richness of material and elaborate and costly artistic embellishment, it is at least a century in advance of the age. To describe it is like trying to give reality to an air castle, but the attempt must be made. The car is rectangular in form, and in its normal movement is intended to run head-foremost and lengthwise the track. Its extreme length lacks an inch or two of 100 feet or more. The general style of the exterior is flamboyant gothic, with a dash of Queen Anne and renaissance, the side elevation as a whole presenting a wilderness of architectural refinements, exquisitely wrought pinnacles, interlacing arches, flowing traceries, foliations, pendants, and the like, painted in richest bronze, and surrounded by a graceful mansard roof with a nickel-plated balustrade wrought in open patterns resembling fringes of lace. The body framing is creosoted live oak and Malabar teak, and the outside carved work of ebonyized cedar. The entrance, which is at the rear end, is by a flight of veined marble steps, each with a carved "M. Q." monogram. These steps rest upon a kind of elastic cushion, and are so arranged that when the car is not on exhibition at the terminal stations, they can be folded up and placed inside the vestibule, and the ordinary wooden steps used in their stead.

A glance at the interior from either end discloses a vista of surpassing beauty, something like the nave of a cathedral, but far more enchanting and fairy-like. Upon each side of the central passageway is a row of cluster-columns, in imitation of mottled jasper and serpentine, with elaborately carved ivory capitals supporting a rich cornice and the mansard roof or clear-story. Upon each side of the car are two polygonal bay windows of unique and original design curtained with gold-embroidered damask looped back with ropes and tassels of gold. The intermediate windows are of the finest plate glass, half an inch thick, but of moderate size so as to admit a good width of panel between them for the decorative work which is exceedingly varied, consisting of arabesques, boules and fretwork, shell marquetry, Florentine mosaics, and numerous conceits derived from the Saracenic, Pompeian, Byzantine, Japanese and other styles which distinguished the classic epochs of high art. The chairs, tables, lounges, etc., are upholstered in brocade damask "cut on the bias" and overlaid with a delicate film of lace-work beautifully interwrought with lilies, palm leaves, fleur-de-lis and roses. The legs of the furniture are of Thuja-root from Malacca, with claw-feet of ivory, and are marvels of richest carving, representing mythological deities, storks, unicorns, dragons, imps, peacocks, cupids and gorillas. The clear-story windows are of the round Milanese wheel pattern, with stained cathedral glass imported from Sorrento, and representing, in many-colored tints, the nine muses, Shakespeare's seven ages, the signs of the zodiac, and the flags of all nations.

The most wonderful feature of the car, however, is the magic way in which the main saloon can be made to undergo a series of transformations as surprising as they are convenient and beautiful. At one moment it is a long and gorgeously furnished drawing-room; then, by depressing a lever similar to those used for interlocking signals, it is a vast dining hall; then, by the action of another lever, it is a first-class hotel with a high-toned clerk, and a sleeping apartment for each occupant; then an opera-house for musical entertainments and amateur theatricals; then a skating rink, and lastly, it can in a trice be turned into four magnificent ten-pin alleys, the pins standing upright by means of a metallic ball at the bottom end which is pressed into an elastic socket in the floor, from which it is bounced out when struck by a ball. This transformation arrangement has been patented in every part of the world where there is an organized patent bureau. Another

feature is the exhibition of rare paintings, framed in hand-painted panels and which can be shown at any time by the brakeman. These gems of art include the Landing of the Pilgrims; Dance of Satyrs; View of Jersey City by Moonlight; Combat between Napoleon and the Flavian Amphitheatre; Portraits of Victoria, Woodhull and the Wandering Jew; Scene in the Bowery on St. Patrick's Day, and Death on a Pale Horse. The floor of the main saloon is of alternate stripes of cedar and sandal-wood, matched and grooved, and covered with a carpet of Aubusson tapestry woven specially for the "Mammoth Queen."

On the starboard side of the forward end of the car is an extensive conservatory of native and exotic flowering plants, from which bouquets can be obtained at fifty cents each upon application to the chambermaid. In connection with the conservatory there is also a miniature lawn and fountain; also an aquarium stocked with rare fish and other aquatic curiosities. Passengers are not of course allowed to croquet or walk on the grass. On the other side of the forward end are the ladies' boudoir, a bath room with hot, cold, plunge and Turkish baths, and a library and reading room. On the outside of the forward end is a broad, semi-circular balcony, inclosed with a highly ornamental bronzed metal railing, and furnished with easy-chairs, swinging hammocks, camp-stools and silver-plated spittoons. From the center of the balcony a spiral staircase leads to the observatory directly overhead and slightly elevated above the mansard roof. Here are two mounted field-glasses, one for viewing the surrounding scenery, and the other (which has a bent tube with a series of reflectors arranged for the purpose) for inspecting the forward track and looking around curves a mile or two ahead.

The running gear consists of two 8-wheel trucks. The wheels are of the spoke pattern, 72 inches in diameter, and made of Damascus open-hearth steel, each one having been thoroughly tested with 20-pound shot fired at it from a rifled cannon at a distance of 50 yards—the 16 wheels put under the car being the only ones out of a lot of 250 that survived the test. These trucks, it will be observed, have a very long base, for the purpose of dividing up the journal friction and getting round curves easily, it having been discovered that the longer the wheel-base the more easily the curves are traversed, especially sharp-cornered ones. The mid-ship space underneath the car between the trucks is utilized as a basement or cellar, in which is the kitchen, wine-vault, refrigerators, a fire-engine of 10-horse-power, a donkey-engine for generating electricity, life preservers to be used in case of collisions or running off the track, also a safe for valuables, a few jack-screws, wrecking tools, duplicate castings and draw-springs. This cellar is extremely useful, not only as a storage room, but also as a depository of weight for ballasting the car and keeping it trim and steady when going down heavy grades at high speed. The heating and lighting are both supplied by the donkey-engine, and in such a way that each person can heat, light, and even ventilate himself as he pleases, without in the least incommoding those about him. This invention is patented and is now being tried for the first time with great success.

To enumerate all the features of this wonderful structure would fill a profusely illustrated volume. In the epitome we have given, many things are necessarily omitted, such as the laundry, barber-shop, burglar alarm, call-bells, annunciators, and the entire catalogue of books in the library (which includes Tupper's Poems, The Complete Angler, and a full line of standard classical literature. Suffice to say in conclusion, that the car is equipped with Westinghouse automatic platforms, the Miller air-brake, speed recorders, station indicators, water-coolers and all modern improvements. No free-pass dead-heads are allowed to ride in it, nor any one who is not good-looking, well-bred, moderately high-toned, and able to wear good clothes.

An Improved Car Door Fastener.

The cuts illustrate an improved fastener for freight car doors, the latch and drop-fastener adjusting themselves automatically as the door is pushed to, as shown in Fig. 1, in which the door is represented as closed, latched and fastened. The car is then ready to be moved or sealed. Fig. 2 shows the latch-bar raised, ready to push the door open, the bar being held up in position by the drop-fastener, so that both hands may be used in opening the door. Fig. 3 shows car door as being

closed, the latch-bar raising the drop-fastener as the door is pushed to. Instantaneously on the door being closed, the latch-bar and drop-fastener, by their own weight, assume position as in Fig. 1. There are no pins and no hand work.

A sufficient number of the fasteners for testing,

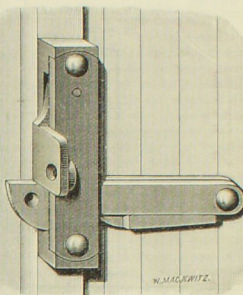


Fig. 1.

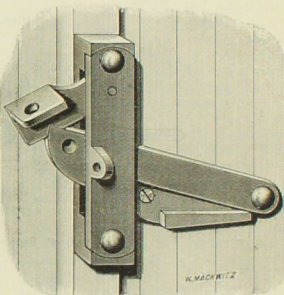


Fig. 2.

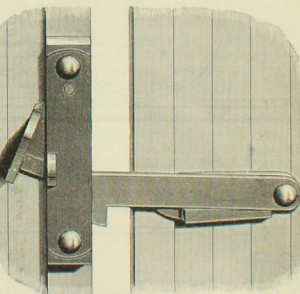
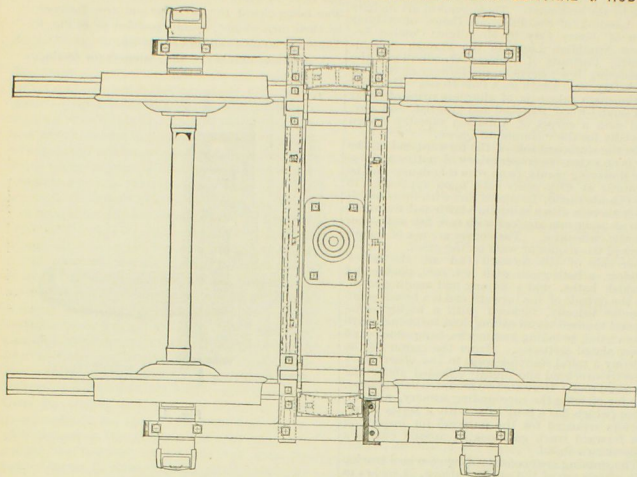


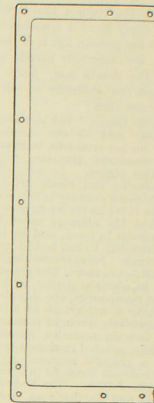
Fig. 3.

and any further information that may be desired, will be furnished on application to Andrew Warren, General Agent, 713 North Second street, St. Louis, Mo.

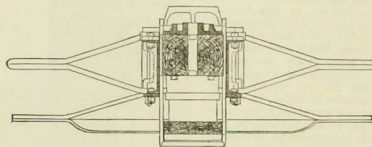
STANDARD FREIGHT CAR TRUCK—NEW YORK CENTRAL & HUDSON RIVER RAILROAD.



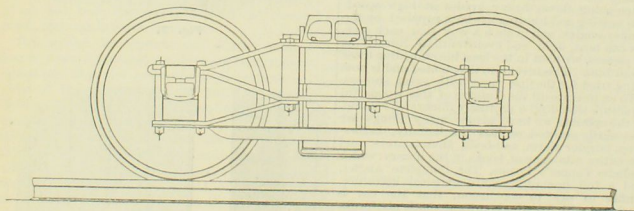
Plan.



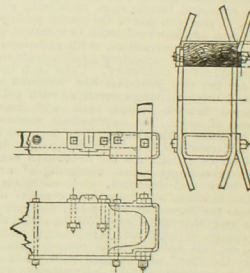
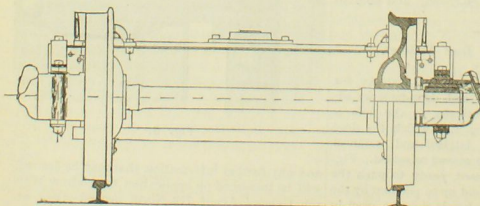
Auxiliary Arch-Bar.



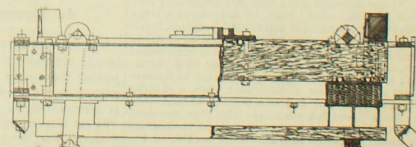
Longitudinal Section Through Center.



Side Elevation.

WOOD TRANSOM.
Part Plan, End Elevation, and Section.

End Elevation and Section.



Transom Section.

Bolster Section.

DIMENSIONS OF TRUCK.

From center to center of axles.....	5 ft. 0 in.
Center to center of journal bearings.....	6 " 3 "
Wheel gauge.....	6 " 8 "
Length of axles.....	6 " 11 1/2 "
Length of journals.....	7 " "
Diameter of journals.....	3 3/4 " "
Width of swing bolsters.....	12 " "
Width of swing hangers.....	13 " "
Length of spring plank.....	5 " 9 "
Length of transoms.....	6 " 6 "
Between centers of side-bearings.....	5 " 5 "
Between centers of swing hangers.....	4 " 5 "
Between centers of swing-hanger bearings.....	4 " 8 "
Wrought iron in channel bar truck.....	1,497 lbs.
Cast iron in channel bar truck.....	2,683 " "
Total weight of channel bar truck without springs.....	4,508 " "
Total weight of wood transom truck without springs.....	4,647 " "

This truck is the standard recently adopted by Mr. W. H. Vanderbilt for the New York Central & Hudson River, Canada Southern, Michigan Central, and Lake Shore roads, and is not materially different from the truck that has been in use for some time on the first-named road. It has channel iron transoms, also the Hewitt box-lid. The most notable features are the auxiliary arch-bars and truck bolster swing-hangers, the construction of which, as well as the advantages of using "formers" and steam hammers in shaping the iron work of trucks, is referred to in the article under the head of "Shop Notes." The auxiliary arch-bars are particularly serviceable in keeping the truck from getting out of square.

The swing-hangers, instead of having two eye-bars and two pivots at each end of the bolster, are U-shaped, and with one pivot which is at the top as shown in drawing. Instead of taking the pivot in a round hole, and thus bringing all the wear of the swing motion upon the surfaces of the pivot and hanger which are in contact, the hanger is made with square holes, and the pivot of a square bar to fit the holes. The pivot has a journal about 8 inches long at each end, and the wear comes upon these and their bearings. At the bottom there is a casting with a half-round surface which fits the cast bearings that are bolted to the under side of the spring plank, and these make a bearing the whole width of the plank. The tie-rods have an eighth twist to prevent their breaking from the vibrations given to flat ones in running.

Another special point in this construction is the abundant room provided for springs, so as to admit of a choice of patterns and sizes, whether rubber, spiral or elliptic. In regard to the relative cost of repairs as between hand-made iron work and that produced by the use of formers and templates, the latter has proven to be much the most economical. Even in accidents, the wheels and axles are likely to suffer more than the other parts.

Shop Notes.

WEST ALBANY SHOPS OF THE NEW YORK CENTRAL & HUDSON RIVER RAILROAD.

The shops at this place for the construction and repair of locomotives and cars, are perhaps, with one or two exceptions, the most extensive in the country. In the car department the average number of cars repaired per day is about 200, the mere handling of which would require a small army of men, were it not that every car is moved and placed in the desired position by steam power. In the main shop where the light repairs to freight cars are made, and where many cars are repaired without being unloaded, there are 21 tracks which extend through the shop to the yards on either side. The paint shop also has track room for upwards of 40 passenger cars, and the service of both shops requires three, and sometimes four, locomotives to do the handling and placing. Two extensive shops are devoted to new work, heavy repairing and rebuilding. Between these is a transfer-table pit 416 feet in length, with 20 tracks upon each side. An illustrated description of this table will be found in the CAR-BUILDER for June, 1878, but many of our readers at this time may not

have that number of the paper, a brief reference to some of the special features of this admirable piece of mechanism may not be out of place.

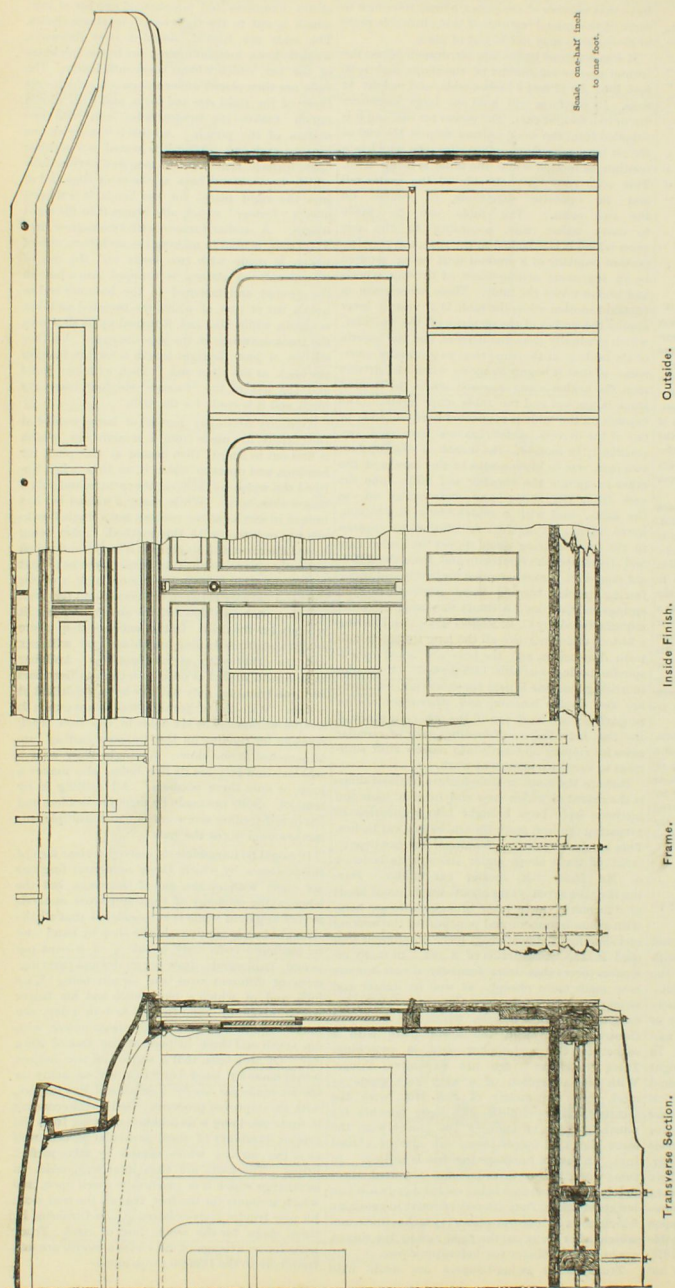
It was designed by the late Mr. Joseph Jones, the former master car-builder of the shops, and is 60 feet long by 17 feet 6 inches wide, and weighs 12 tons. Its platform will hold one large passenger car or two freight cars. The power for running it is supplied from the wood-cutting shop at the end of the pit by means of an endless wire rope which is in continuous motion while the table is being used. This rope runs on each side of the center-rail and in opposite directions, of course, on the two sides. The table can be made to move either way, according to the side upon which it is attached to the rope, the very important requisite of a gradual start being secured by an ingenious arrangement of driving wheels and brakes under the table. These wheels are in constant motion when the table is at rest; a lever applies the brakes at the pleasure of the operator, which gradually stops the drivers, and the inertia of the table is at the same time as gradually overcome, so that it begins to move when the drivers stop, the brakes being released when the desired track is reached and the table stops again. The capstan on the table is connected with the axle of one of the drivers, which, as we have said, are constantly in motion. By means of the capstan, two men, one to hitch a rope to the cars, and the other to operate the capstan and table, take the cars from the shops and side-tracks on to the table, and with a snatch-block in addition, move them off again. A stationary capstan in the wood-cutting shop moves the loaded cars and distributes the lumber to and from the different machines. Cranes are used for lifting and transferring trucks, turning them over, putting in springs and the like. A rotary mortising machine, manufactured by C. B. Rogers & Co., and having a 34-foot table, mortises all the long timber to uniform dimensions, and the holes are bored by a 2-spindle boring machine attachment. A smaller mortising machine is used for short timbers. There are also double tenoning and other machines for preparing wood-work for all the other car shops of the line, including a self-feeding gang of circular saws for ripping up boards into narrow stuff sufficient to keep two planers at work.

Perhaps the most notable feature of these shops is the extent to which new and original tools and methods have been brought into requisition in preparing the iron work for trucks and car bodies. This has been a marked feature of the car department of these shops under the superintendency of Mr. Hoyt, the master car-builder. During the past seven years about 400 different kinds of "formers" have been brought into use here, with steam-hammers and punches for the making and shaping of almost every piece of wrought iron used in the construction of a car. In many instances pieces that were formerly of cast iron are now made more cheaply, as well as lighter and stronger, of wrought iron; the corner-plates for freight cars, for example, which are bent and formed at one heat, the lower plate with a socket for the pushing-bar used in switching. These "formers" are not expensive things. With the exception of a very few made of steel, they are mostly of cast iron, with the wearing surfaces chilled. The loose punches for punching holes in many of the pieces with the same blow that forges them, are also of chilled iron. In case of breakage the loss is trifling. In some work, two or three punches are used alternately, the heated ones being cooled meanwhile in a bucket of water. They are very effective in punching 2-inch holes in follower-plates 1 1/2 inches thick, and which, after being cut the right size by the shears, are heated to a cherry red before punching. Truck-bolster swing-hangers are made with

steam hammers and punches, of one bar of iron, which is cut to the right length by steam shears. The ends are heated, doubled over flat-ways, welded down and hammered out to the thickness of the bar, which widens them sufficiently. The ends are then placed under the punch, which cuts them of the right size and form, and with a loose punch makes the square hole, both with one motion of the punch. All this is done with one heat for each end. After it is heated in a peculiar open furnace that has two long and narrow fires which heat several bars at the same time and at just the right places for the bends, it is shaped over a "former" which also brings it to the right length. A similar furnace with two narrow fires 5 feet long is used in making the arch-bars, one of which is made with two heats and the use of "formers." A stirrup is dropped into a hole in the ground and fastened to the hammer bed to hold a bar of iron, of which the inverted arch-bar is made, while the end is turned up as shown in the truck drawings on the opposite page. Another stirrup of just the right length is used in making the hook at the other end. Then with two heats and the use of the "former" its four bends are made and it is ready for the drill.

Auxiliary arch-bars instead of being welded at the corners, are made from a straight bar, which is first cut to length, then heated at the place for bending, and upset to widen it, so that when finished the width is 4 inches at the corners, and only 3 inches elsewhere. While many a welded bar has broken in service at the corners, not a single breakage has occurred with this method. After being upset, the bar with a single heat is bent and finished perfectly square at one of the corners, the next heat makes the other corner, another on each arm for the bend flatwise between the corner and the end, and then with two blows of the steam hammer it is ready for the drill. In the machine shop there are two multiple drilling machines, one with six and the other with eleven spindles. Arch-bar holes are all drilled at once. In the auxiliary bars and iron transoms only half the holes are drilled at a time. With the proper dies the steam-punch is a rapid worker. The six holes in the iron truck transom for riveting on the transom casting are all punched at one blow. A single blow cuts a seal lock and punches its five holes, also makes a hasp, or cuts three washers. All drilling is by templet. Bolts are made by machine headers and cut in self-feeding screw cutters, and multiple cutters are used to cut the nuts.

It would be impossible to convey a clear idea of the processes by which these numerous forgings are made without the aid of drawings, but the labor-saving economy of these improved methods is very apparent when it is considered that all the wrought iron work done in the shop by hand and by machines costs only about 1/2 of a cent per pound. To illustrate, draw-bar guides and carrying-irons of different sizes, the largest being 5/8 x 8 inch, and of which a blacksmith and his helper would make by hand from 6 to 8 in a day, are made with formers and with steam power, with one smith and three helpers, at the rate of 200 a day. Of arch-bars, that a smith and two helpers would make by hand 6 or 8 in a day, as many as 420 are made per day by a smith and five helpers, with the improved processes. Besides the economy in first cost, there is an additional saving from the greater durability of these particular parts as well as of the car as a whole, caused by more perfect fitting. The parts are thus interchangeable, an advantage which it is needless to dwell upon, and which accounts for the fact that all the iron work for new trucks, body-bolsters, etc., is furnished by these shops for the whole line of road. Truck irons for an average of fifty cars a month are sent from here to the Buffalo shops alone.



PASSENGER COACH CONSTRUCTION-NEW YORK CENTRAL & HUDSON RIVER RAILROAD. Outside Truss Plank.

DIMENSIONS, ETC.			
Length over sills.....	54	ft.	0
Width over sills.....	9	ft.	6
Top of sill to bottom of plate.....	6	in.	8 1/2
Center of holders to face of end panel.....	5	ft.	9 1/2
Center of car end to outside of sill.....	4	ft.	9
Side window openings.....	2	ft.	3
Door openings.....	2	ft.	3
Trans-plank.....	2 1/2	ft.	10
Plate.....	2 1/2	ft.	10
Distance between window centers.....	2	ft.	10

Side window openings..... 2 " 3 1/2 "

Dome window openings..... 2 " 3 1/2 "

Dome window glass..... 22 " x 31 "

End window glass..... 19 1/2 " x 24 "

Door windows..... 15 1/2 " x 13 1/2 " x 18 "

Door openings..... 15 1/2 " x 13 1/2 " x 18 "

The special feature of construction which the drawings show is the position of the trans-plank and the plate, placing it on the outside instead of inside the framing.

was first adopted by Mr. Holt in some passenger cars built at the West Albany shops last fall. The studs and posts are cut away 2 inches, and the plank is boxed over them 1/2 an inch. Between the plank and the windows the plank is cut away 1/2 an inch, and the shoothing is boxed on 1/2 an inch and put on with glue. After the floor timbers are framed and the sills crowned 1/4 of an inch by the trans-rod, the trans-plank is sprung to its place outside of the posts and secured by means of a screw in the center of the post, by means of which it will fit and assist in bracing and strengthening the side framing. The

plank is bolted to the sills in the usual way, and there are no braces. Another object is to have the trans-plank, together with the extra shoothing between it and the windows, give the outside of the car a stronger shell, so that in case it should get off the truck and be rolled over, there would be less danger of breaking and splintering. The floor is double, and laid diagonally across the floor timbers in opposite directions, the boards of the top layer being laid in one direction, and the boards of the bottom layer being laid in the other. A third or fourth floor is laid on strips between the timbers.

Grinding Chilled Car Wheels.

The following statements in regard to the economy of grinding the chilled treads of car wheels, are officially certified to by officers of the motive power and machinery departments of the roads named.

During the year 1880, the number of wheels ground at the Sacramento shops of the Central Pacific road was 3,400, of which 510 were new wheels. Of the 2,890 old wheels ground, ninety per cent. were more or less flattened. The cost of grinding is estimated as follows:

Labor in running the Gowan machines.....	\$1,347.19
Emery wheels.....	1,075.34
Repairs of machines, and lubrication.....	438.00
Power.....	250.00
Royalty, 50 cents per wheel.....	1,700.00
Interest on cost of four machines.....	330.00
Yearly depreciation of same.....	400.00
Add for contingencies 10 per cent.....	555.05

Total cost.....\$6,083.52

The cost of replacing with new wheels the 90 per cent. or 2,601 flattened wheels that were worthless except as scrap (including interest on 1,300 new wheels to be kept in stock, and deducting value of old wheels as scrap at \$8.50 each), is estimated at \$24,578.77, from which deduct \$4,633.19, or \$1,78.9 per wheel, for grinding the 2,601 wheels, leaves \$19,925.58 as the total saving by the use of the machines.

The following statement of the cost of car and engine wheels, purchased by the Virginia & Truckee Railroad during the years named, is very significant in view of the fact that no wheels were ground until 1877, when the grinding of them was begun, and has been continued every year since then.

Year.	No. Car Wheels.	No. Engine Wheels.	Total Cost.
1874.....	407	169	\$21,280.96
1875.....	458	212	14,869.25
1876.....	530	122	13,342.35
1877.....	135	12	3,731.29
1878.....	181	25	4,739.35
1879.....	30	29	1,008.41
1880.....	184	20	4,242.00

Some Suggestions about Freight Car Running-Gear.

A master mechanic upon a Southern road, after noticing some defects in the "M. C. B." oil-box drawing and dimensions of standard axle, makes the following suggestions:

I would suggest to those who have the facilities for experimenting, to try the possibilities of a steel car-axle with a journal $3\frac{1}{2} \times 6\frac{1}{4}$. It would be quite an acquisition to railroad experience to have some accurate information for such an important subject. It is only a question of time when steel will supersede iron in other railway appliances, and if light steel axles give better results than heavy iron ones, they will eventually become universal on the trunk lines of the country.

I would also suggest, by way of experiment, that the journals of iron car-axes be case hardened before being put into service. There is little room for doubt but that the cost of case hardening would be more than repaid by the increased mileage of the axles so treated.

There seems to be a desire on the part of many for a standard draw-bar and self-coupler for freight cars. Before such a consummation is effected it would be well for those interested to examine the manner of attaching the draw-bar under the body of the car. I have reference to the anti-diluvian method of fastening the draft-timbers underneath the center stringers. In a butting collision they invariably break off or spread apart from the original position. I would ask, why is it that the draw-bar on freight cars can't be placed between the center stringers, and in a line with the body of the car? As they are now arranged, the crushing and tensile strains are received below the line of rigidity and strength, and consequently the repairs for broken draw-heads, draft-timbers and split-center stringers, are a large element in the total cost of car repairs.

It is a matter of doubt whether the master car-builders can adopt a standard draw-bar and self-coupler which will give general satisfaction and at the same time retain the standard height of 33 inches above the rail. Would it not be well to discuss the subject beforehand as to the proper place

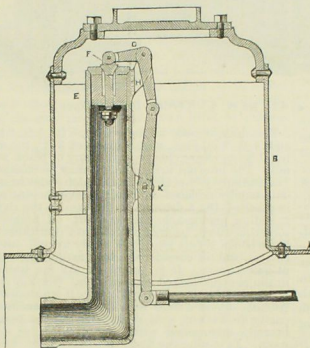
to locate and fasten the bumper and draw-bar, before adopting one which may not serve the purpose intended, thereby becoming a bone of contention in the future?

While uniformity, and interchangeable parts of rolling stock are things to be desired, it must not be forgotten that a great many railroads throughout the country are unable, owing to their location, small earnings, and dilapidated rolling stock, to accept every change which may be considered an improvement on the present system of construction and equipment.

R. G. N.

An Improved Throttle-Valve.

The cut illustrates an arrangement of a throttle valve for locomotives and other engines, so that the valve may be opened gradually by being relieved of a portion of the steam pressure, and thus obviate the danger of starting the engine too suddenly. This object is attained by placing within the main valve a small additional valve, which will always open before the main valve. The cut represents in section the dome and throttle pipe of a locomotive, showing the pipe and valve and the arrangement of the levers. The valve is placed in the dome and secured to it and to the dry-pipe in the usual



way. At the top of the throttle pipe is the main valve E in the center of which is situated the supplemental valve F. The stem of this valve passes through a guide in the lower part of the main valve F, and by means of nuts in the lower end of this stem, the distance which the supplemental valve lifts before the main valve commences to open, can be adjusted at will. To the top of the supplemental valve F is attached a bell-crank G, which is pivoted on a bracket H cast on a throttle-pipe.

To the other end of the bell-crank is attached a lever which is pivoted at a point near its center to a bracket K also cast on the throttle-pipe. To the lower end of the lever is attached a rod which passes through a stuffing-box in the end of the boiler and is worked by a lever in the usual manner. The lever and bell-crank G form together a toggle-joint, thus securing ample force to lift the valve, combined with considerable delicacy of movement. The stem of the supplemental valve lifts the main valve by means of the nuts and washer on the lower end.

It is claimed for the valve that the supplemental valve, being small, is easily opened against the pressure of steam, and that after it is opened the larger valve becomes nearly balanced and is also easily opened. It is also claimed that it can be repaired readily and cheaply, and that it is very durable.

Further information may be obtained by applying to Mr. Henry Watkeys, the inventor, or to Mr. L. C. Watkeys, Agent, Syracuse, N. Y.

Car-Builders' Monthly Meeting.

The last meeting of the season was held at the Association Rooms, April 21, the subject for discussion being the condition of freight cars employed in interchange through traffic.

Mr. J. H. Raymond, of the Western Railroad

Association was present, but not being prepared to speak upon the subject announced, delivered a lengthy and interesting address upon the official relations of master car-builders with their superior officers and with their foremen and employes, which we regret our space does not allow us to publish.

A short discussion then followed in reference to the condition of freight cars. Mr. L. Garey had been told by a man who inspected more cars than any other man in the country, that fifty per cent. of them were "cut out" on account of defective draw-bars. He also spoke of the good results of joint inspection at Buffalo and Canandaigua on the New York Central road, in which the interests of its immediate western connection as well as its own were looked after by men who had no connection with either, and who were free from bias or prejudice. Mr. Adams didn't like the plan. He did not believe any man could, under the circumstances, be entirely disinterested and free from bias. The joint inspection might work very well in this particular case, because the roads concerned were identical in respect to ownership, but let a controversy arise between any one of them and some other road with different owners, and the plan would not work so smoothly. Mr. Forney suggested that the plan was equivalent to arbitration. Mr. Garey said there was no arbitration about it. It was joint ownership, and the inspectors were paid by the respective roads. The plan, so far, had worked well. No difficulty had been experienced, and an immense amount of money and time had been saved in transferring freight. There was some further discussion about the necessity of keeping line cars in good condition.

Letters were read from Mr. John Orton, of the Canada Southern, Mr. J. P. Coulter, of the Ohio & Mississippi, and Mr. Tho. Aylesbury, of the Kansas City, St. Jo. & C. Bluffs.

Car Ventilation.

What seems a most perplexing problem to solve is how to get fresh air into railway cars. Of all structures this would seem to offer the greatest facilities for thorough ventilation, as it is in rapid motion, and can be constructed with numerous outlets for the escape of impure air. In spite of these features, the atmosphere in the average car is not invigorating; and if we consider the smoking-car, we have visible evidence that the change in volume is very slow, to say the least.

Perhaps persons who are trying to improve matters in the direction indicated are working at the wrong end of the trouble. Instead of openings in the roof, which make down drafts and let in cinders and dust, how would it do to make openings in the floor?

We do not claim this as any invention of our own, or as an original suggestion, for there were smoking-cars on the Connecticut River R. R. some years ago that had round holes in the floor, about six inches in diameter, just under the feet of passengers, which went right through the bottom. These were intended for use as spittoons, and, curiously enough, they answered also as ventilators, for we traveled on the road frequently when the cars were crowded, yet do not now recall any time when they were at all disagreeable by reason of smoke.

We have thought that essentially the same feature could be used on passenger cars with a change in the direction of the opening.

Suppose that a box two feet wide and one foot deep be made running the length of the car, and attached to its under side; said box to be open at both ends, and perhaps provided with a flaring mouth to induce a greater volume of air to pass through. Into this box let smaller boxes enter at

right angles, and opening into the body of the car six inches above the floor on the sides. The effect would be to create a current of air in motion at the bottom of the car and draw off the vitiated air that lies on the bottom by its own weight. Foul air is heavier than fresh, and cannot be expected to rise to the roof, but by the plan we have suggested, which is new to us in its application, we think that a better atmosphere could be induced in railway cars than is now. Whatever dust the box-ventilator picked up would pass right through it, and each car might be connected with the one ahead of it by canvas couplings to the ends of the boxes, which would carry a constant current through every car in the train. We should like to see this plan tried, as we think it possesses useful features.—*Mechanical Engineer.*

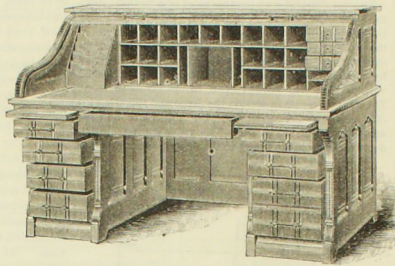
[The suggestion, or rather the principle it embodies, is a good one. We have always favored a system of car ventilation by which the air is exhausted at or near the car floor instead of at the top, especially in Winter, when ventilation is most needed, and when fresh air cannot be admitted in any quantity directly from the outside without annoying the passengers with cold drafts. Let the cold air be forced in by the speed of the train, and warmed by passing between the stoves or other heaters and a surrounding jacket or casing, and then when it enters the car it will necessarily force out a corresponding quantity of cold air next the floor, which is not, as is generally supposed, the purest, nor is the warm air at the top of the car the most impure. On the contrary, it is in our judgment rather the reverse of this; so that with exhaust registers at the bottom, the cold air with its impurities is constantly forced out, and the freshly admitted warm air is retained instead of being wasted through the top ventilators before it is used. And furthermore, something like a uniformity of temperature is maintained in the car, instead of a difference of from 30 to 40 degrees between floor and roof, as is often the case in very cold weather.—ED. CAR-BUILDER.]

THE *American Engineer* (Chicago) has passed into the hands of Mr. Merrick Cowles, the general agent and corresponding editor of the *Railway Review*, who is now its sole proprietor, he having purchased the interest of his previous partner, Mr. Willard A. Smith. The experience and business capacity of Mr. Cowles are a sufficient guarantee that this attractive and ably-conducted journal will continue to merit and receive the support of the engineering profession. It has exhibited since its first issue a steady growth and improvement, and bids fair, at no distant day, to rival its great English contemporaries.

A CORRESPONDENT of the *Industrial World*, writing from central Missouri, says of the farming community of that section: "The waste of timber is appalling. They girdle and burn up magnificent forests of oak, hickory, ash and linden to make new wheat and corn fields, while the old ones are not half cultivated. They split elegant young walnut and cherry into millions of common rails to fence land only worth \$8, \$10 and \$20 per acre, and then wonder why they must pay three prices for walnut furniture from factories a thousand miles away. They even put walnut logs into sluiceways, cabins, pig-troughs, cord-wood and washouts, without a thought that the timber famine will appall them twenty years hence."

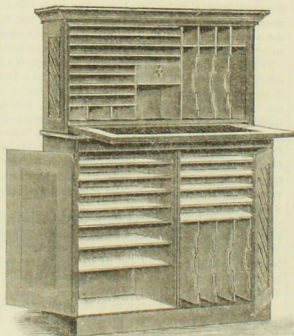
Desks for Railroad Offices.

The engravings illustrate a style of office desks manufactured by A. H. Andrews & Co., of Chicago, and specially adapted to railroad uses. These desks are not only commodious and convenient in the details of their arrangement, but in beauty of design, richness of material and finish and superior workmanship, they are intended to give to railway offices of every class a style of fitting up in the way of furniture, corresponding in some degree with the beauty and elegance of the finest palace cars.



o. 42. NEW CURTAIN DESK (Open).

This desk is made in three sizes, 5 ft. 5 in., 5 ft. 6 in., and 5 ft. 8 in. long, with a depth of 2 ft. The material being either cherry, mahogany or black walnut. The internal arrangement may be changed. The stationery-case at the left, which slides in and out, can be replaced by 9 stationery shelves, and in place of the 4 drawers in the base on the right, a sliding pigeon-hole case, opening on hinges, is sometimes used, back of which are 4 partitions for large books. This case rolls easily in and out on casters, and is considered a fine arrangement for utilizing space. It is patented. All the drawers in the base are locked without keys. One key only is required for the whole desk, since it is automatic. At each side is a slide leaf, 30x14 in., seen in cut partly drawn out, so that the sifter at the desk is literally surrounded with 18 square feet of desk room. In closing the desk, the curtain (of wood) is drawn down instantly, covering all loose papers and locking the drawers. For the use of general managers this style is very elegant and commodious, as it gives so much space, and is not likely to get out of order like most desks with a large number of compartments.



NEW RAILROAD STATION DESK.

This desk is designed to supply the demand for an inexpensive, neat, compact and commodious desk and case for "rank and file" uses, and for stations where blank forms are used, and where books can be safely kept. This style is usually of ash, finished in oil and shellac, the doors having Eastlake panels.

This desk, also with automatic locks, and of three sizes, 50, 60 and 72 in. long by 37 deep, is made low, so the occupant can easily see over it. The material is either walnut, cherry or mahogany.



NO. 43, LOW CURTAIN DESK—Open.

and it can be made with or without the patent base referred to. The design is new and very handsome. For some positions this desk is preferable to No. 42, especially where a large number of pigeon-holes is not required.

The above described desks are largely used by the following railroad companies, which is an evidence that they are well adapted to the special uses for which they are designed: Chicago & Alton; Chicago, Milwaukee & St. Paul; Chicago, St. Paul & Minneapolis; Wabash, St. Louis & Pacific; Chicago, Burlington & Quincy; Chicago & Northwestern; Chicago & Rock Island; Michigan Central; Atchison, Topeka & Santa Fe, and others.

THE Delaware, Lackawanna & Western R. R. shops, at Oswego, N. Y., are building 150 box cars; 100 of which are of the standard size, 30 feet long inside; and 50 of them are 33 feet long inside and 37 feet over the dead woods. They all have the Safford draw-bar and Winslow roof. The latter is sealed inside to protect it from injury in the handling of freight. In addition to the usual body truss-roads, the cross frame tie-timbers are trussed with two $\frac{3}{4}$ inch rods placed just outside the timbers. The inverted arch-bars are continued from top of journal-boxes 22 inches and braced by the pedestal tie-bars, which are carried up from the bottom of the boxes. Upon each end of these are bolted a $3\frac{1}{2}$ x 4 in. beam of wood, with a $\frac{1}{2}$ in. plate of iron on the under side. The brakes are hung from these beams, and of course outside the wheels. This plan has been in use several years and works well.

THE Missouri Pacific road has some consolidation engines, with 22 x 22 in. cylinders, and 8 driving wheels, 30 inches in diameter, all connected; weight on drivers, 90,000 pounds; on pony truck, 12,000; total weight, with fuel and water, 160,000. Mr. Hewitt, the superintendent of machinery, says in an official report to Superintendent Talmage: "They can make schedule time on a grade of 10 feet per mile, with a train of 100 loaded cars, if their weight, including load, does not exceed 40,000 lbs. each. On a 25-foot grade they can haul 60 cars; on a 50-foot grade, 39 cars; on a 75-foot grade, 28 cars; and on a 100-foot grade, 21 cars. This number of cars is the minimum, which can be increased 15 per cent. under favorable circumstances."

THE Erie Car Works, Erie, Pa., have purchased largely of new machinery, including a fourteen-ton hammer and a large planer. These improvements, together with the recent extensive construction of sheds for drying lumber, have increased the capacity of the works from sixteen to twenty cars per day.

The three Wagner sleepers, "Saratoga," "Palatine Bridge," and "Yonkers," which were recently rebuilt at the West Albany shops, with all the latest improvements, including smoking-rooms, have just been painted in Eastlake designs at the Niagara shops of the company.



PUBLISHED MONTHLY

BY

R. M. VAN ARSDALE,

5 DEY STREET.....NEW YORK.

JAMES GILLET, Editor.

L. E. WATERMAN, CORRESPONDING EDITOR.

MAY, 1881.

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EDITORIAL ANNOUNCEMENTS.

Addresses.—Business letters should be addressed, and drafts and money orders made payable, to THE NATIONAL CAR-BUILDER. Communications for the attention of the Editor should be addressed EDITOR NATIONAL CAR-BUILDER.

Advertisements.—Nothing will be inserted in this journal for pay, except in the ADVERTISING COLUMNS. The editorial department will contain our own views and opinions; and the rest of the reading matter, aside from advertisements, will be such as we consider of interest to our readers.

Contributions.—Articles relating to railway rolling stock construction and management, and kindred topics, by those who are practically acquainted with these subjects, are especially desired. Also early notice of changes in railroad officers, organizations and names of companies.

SUBSCRIPTIONS TO THE CAR-BUILDER will be received, and copies kept for sale, at the following places:

A. WILLIAMS & Co., 283 Washington Street, Boston, Mass.

L. SCHAFFNER, Cigar and News Dealer, Grand Pacific Hotel, Chicago, Ill.

WILLIE H. GRAY, 306 Olive Street, St. Louis, Mo.

ROBERT CLARKE & Co., 65 West Fourth Street, Cincinnati, Ohio.

THE SUPPLEMENT TO THE CAR-BUILDER, containing Lists of Street Railroads in the United States and Canada; Car and Locomotive Builders; South American Railroads, etc., will be ready for mailing with our regular June number. The proprietor has been induced to compile and issue this publication to meet the frequent calls for this kind of information. Copies of same will be sent by mail for 25 cents each, or five copies for \$1.00.

RULES FOR INTERCHANGE OF FREIGHT CARS.

Members of the Master Car-Builders' Association who desire a revision of the existing rules in reference to the interchange of freight cars, or who think that such revision would be for the interest of the roads they represent, are requested to write to the president of the association, asking him to call a meeting for that purpose in accordance with the provision in the rules authorizing him to make such call.

A WORD TO THE COMMITTEES.

Only a month remains before the annual meeting of the Car-Builders' Association will take place in this city. The attendance of members is likely to be as large as usual. Considering the importance and variety of the topics to be reported upon by the committees, and the discussions which will follow the presentation of the reports, the attendance ought to be much larger than it has been for several years past, and doubtless it would be were it not for the pressure of work in most of the road shops, and were the place of meeting a more central one.

It is hardly necessary to remind the members of the association that the beneficial results of these meetings in the better construction and management of railway cars of all classes, depend very largely upon the work done by committees. The reports of committees take precedence of everything else. The subject matter of each is presumed to be of some consequence and worthy of being investigated; and furthermore, each committee has a whole year in which to do its work.

If the reports that are presented are meager and hastily prepared, evincing only a modicum of the labor and thought that should be expended on them, or what is worse still, if there is no report at all forthcoming when the call is made, the convention is in either case without any proper basis upon which to work, and can only resolve itself into a kind of general committee, or committee of the whole, as it is called in Congress, and discuss in a hap-hazard, rambling, aimless sort of way whatever topics chance may suggest.

If, on the contrary, the reports are carefully prepared, and embody the results of diligent investigation, they will command attention and constitute a valuable record for future reference. We are aware that some of the committees labor under peculiar disadvantages in not being able to confer together as often as would be desired. There is also great difficulty in procuring information that is indispensable to the making of such reports as would be satisfactory to them or to the convention. A good deal of this is chargeable to those who receive the printed circulars of the committees asking for specific information upon specific points, and pay no attention to them, unless it may be to write the monosyllables "yes" or "no," or "we do" or "we don't." If this shall meet the eyes of any such delinquent, we hope he will lose no time in performing his duty. We hope also that every member of a committee will go to the convention prepared to make some sort of a report, verbally or otherwise, in case the chairman should not be present to respond to the regular call.

The first committee on the list is the one on the subject of freight train brakes, a subject that also ranks first in importance; and we would earnestly request that any one who has any information about it that is worth having, will send the same to the chairman without delay. Although the forthcoming report of the committee is not expected to make a finish of the matter by the recommendation of a device absolutely complete in itself, and able to control the movement of freight trains in a way scarcely less than miraculous, it will nevertheless present unmistakable evidence that what was regarded a few years ago as an impossible thing is now in a fair way of being successfully accomplished.

The great advantages to be derived from a brake that will enable the engineer of a freight train to control its movement independently of train hands and hand brakes can hardly be appreciated as they should be, and will be, when such a brake shall have been perfected and brought into general use. It will be an improvement compared

with which the power brakes upon passenger trains will be of secondary importance, as they affect the economy of transportation. The one great drawback in freight traffic with the hand-brake system, is the slow movement of trains, the present rate of speed ranging from 15 to 17 miles an hour; while with a brake that would enable the engineer to handle the train exclusively, the present speed could be nearly or quite doubled. Not only would a vast deal of time be saved, but it is also obvious that twice as many trains could be run, especially upon roads or portions of roads where there are four tracks. Nor is this all. It is believed that the cost of repairs per car mile would be less, with an average speed of 25 miles an hour, than they are now. These considerations should be sufficient to enlist the attention of railroad men in the matter of a freight brake, and in the making of such experimental tests of the various devices for that purpose as will tend to an early and successful solution of the problem.

END FRAMING OF BOX FREIGHT CARS.

We have received several letters in reference to the diagrams published in our last issue, and numbered 1, 2 and 3. Three of those letters are from practical car-builders, and exhibit, as will be seen, some difference of opinion. We do not think it worth while to insert the diagrams again, as the reader can easily refer to them in the March CAR-BUILDER.

One of our correspondents prefers No. 2, for the reason that he had noticed that the end-sills of cars framed like No. 1 had curved upwards in the center and sagged at the ends after being some time in service. This had the effect of loosening the two braces so they could easily be moved with the hand. He had noticed, however, that in cars framed like No. 2, and which had been running some time, the end-sills were straight and the braces firm and fast. Plan No. 3 is liable, he thinks, to the same objection as that of No. 1. The two cross-rods in each case support the end-sills as well as keep the center of the car in position, and the reason of the corner-sagging in 1 and 3 is because the lower ends of the braces are outside of the rods instead of inside.

Another correspondent is of the opinion that No. 1 is decidedly preferable. The foundation of the car is the body-bolsters; and the side-braces from the bolster to the ends of the plate, together with the corner-rods, hold up the ends of the sills. The braces running from the ends of the sills towards center of end-plate, together with the middle tie-rods, support the center of end-sills, and give a firm point of resistance against any pulling down of the draw-bars, and also brace the car laterally. The braces in No. 2 do not support the end of the car at the center, nor brace it laterally, for the least sag in the center loosens the braces. The braces in No. 3 strengthen the car laterally, but do not support the end at the center.

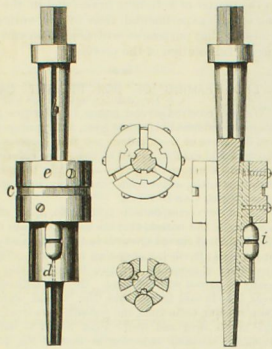
A third communication says that No. 1 is the correct plan, for the reason that the parts of a car where there is the most working strain are those connected with the draft-rigging or drawing attachments. The draw-bars being below the line of resistance, and the breaking strain just over the draw-bars in the end-sill, and over the body-bolster in the center-sills, the kind of bracing that will relieve the end-sills at the weak point is the best, and this is shown in the plan with braces terminating at lower end of corner-posts.

MR. THOS. THATCHER, Master Mechanic of the Utica Division of the Del., Lack. & Western road, has equipped a locomotive with a steam brake that bears upon the back and front sides of each driving wheel. It is the invention of Mr. C. W. Lanpher, of the New York, Ontario & Western, is simple in its construction, and has been working satisfactorily for several months.

THE New York Central & Hudson River road has ordered 1,000 more freight cars, consisting of 34-foot flat and box, and 20-ton dumping gondolas. Half the number will be built by the Harrisburg Car Co., and half by the Jackson & Woodin Co.

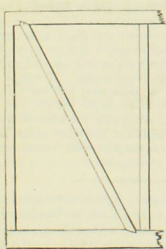
Improved Flue Roller and Expander.

The cuts illustrate an improved tool for rolling and expanding boiler tubes and flues. The head *d* is in three triangular segments, as shown in sectional view. It has a tapering hole, and each segment has a rib to fit a corresponding groove in the wedge-pin *b*, whereby the head is caused to turn with the pin. The enlarged portion *e* is formed by separate segments attached to *d* by screws, and having ribs which enter grooves in surface of *d*, and the whole is held upon the wedge-pin by a spring metal band *c* in a groove around the outside, which band laps at its ends, but is not united, and permits the sections to be expanded. The rollers *f* are held in grooves or sockets upon the surface of the head by their arbors, as shown. The box for each arbor is made by a hole from outer end of head inward to the socket for rollers, which are thus held securely in position, and can turn freely, and as



their arbors are protected from grit, they will not cut out. It will be noted that the rollers project nearly half their diameter from the surface of the segments.

In using the expander, the head *d* is inserted within the flue until the end of the flue abuts against the offset formed by the enlarged portion *e*. The head may then be expanded by driving the wedge-pin farther in, and the head turned by a wrench placed upon the square end of the pin. By having another larger wedge-pin, the expander may be used for flues of any size. The friction when using tool comes entirely upon the arbors, which are protected and will wear a long time. It is the invention of Mr. John McGraw, the boiler foreman of the Rome, Watertown & Ogdensburg Railroad, Oswego, N. Y.



THE method of putting in freight car braces shown in the cut has been in use ten years by Mr. E. E. Pratt, the Master Car-builder of the New York and New England road. The rest of the brace is 3 inches from the corner and body posts and $\frac{1}{2}$ of an inch deep. The end-woods of the timber are thus brought in contact, which permits less shrinking than when the brace rests against the sides of the posts, and any loosening can be readily taken up by tightening the rods.

THE Western Fencing Co., of Chicago, have contracted for the fencing of Chicago & Grand Trunk Railway between Chicago and Port Huron. The contract calls for 5 or 6 painted Kelly steel barbed wires similar to fence built by them for Pittsburg, Cincinnati & St. Louis R. R. last season. The company will build fence at the rate of about 8 miles a day until completed.

THE office of Chas. A. Peck's Son, Agent for Washburn, Hunts & Co.'s Car Wheel Works, has been removed from 5 Dey street to 115 Broadway, New York.

THE effeminate man, who has no enemies, is a weak politician; a cross between root-beer and ginger-pop with the cork left out, a kitten in pantalottes, a sick monkey with a blonde moustache, a paper kite in a dead calm. He is as harmless as a cent's worth of spruce gum, as lazy as a bread pill, and as useless as a button without a hole.

AN Arkansas farmer was absent-minded enough to leave his pet panther and his mother-in-law at home together while he went to a show, but was greatly chagrined and amazed on his return, to find the old lady alive and the panther dead.

A St. Louis gentleman who had taken a room at a Chicago boarding-house was aroused early the following morning by the chambermaid, who remarked that, as it was nearly time to set the breakfast table, she would have to trouble him for the top sheet. This is one version of the story. The other version has the names of the two cities transposed.

Our Directory.

We note the following changes since our last issue. Readers are requested to give us prompt notice of changes when they occur:

Asheville & Spartanburg.—This company has been organized as the successor of the Spartanburg & Asheville. Jas. Anderson is Superintendent.

Atlantic & Pacific.—Mr. H. C. Nutt is the Purchasing Agent of this road, with office at Chicago, Ill.

Baltimore & Ohio.—Mr. W. C. Quiney, formerly General Manager of the company's trans-Ohio lines, has been reappointed to the same position, with headquarters at Newark, O.

Boston & Lowell.—Mr. Charles E. A. Bartlett has been chosen General Manager, in place of Hiram Hosford, deceased. Mr. Bartlett has been for some time Treasurer of the company.

Cleveland, Columbus, Cincinnati & Indianapolis.—Mr. William F. Tureff has been appointed Master Mechanic, vice L. S. Young, resigned. Mr. Tureff, who has heretofore been Superintendent of the Indiana Division, is succeeded by Mr. John O. Ewan, Train Master, with office at Union, Ind. Mr. F. G. Kauffholz, Master Mechanic, and Wm. Cleve, Master Car-Building, of Columbus & Cincinnati Division, have resigned.

Chesapeake & Ohio.—Mr. C. W. Smith has been appointed General Manager. Mr. Smith is now General Traffic Manager of New York, Lake Erie & Western.

Dayton & Southeastern.—Mr. R. G. Butler is General Manager, and F. M. Mast, Master Mechanic.

Denver & Rio Grande.—Mr. C. W. Bradley is Superintendent of the First Division, in place of W. W. Hungerford, resigned. Mr. W. H. Bancroft has been appointed Superintendent of Second Division, vice E. R. Dougherty, resigned.

Eastern.—Mr. Amos Pillsbury has been appointed Superintendent of Motive Power. He was formerly on the New York & New England, and more recently the Master Mechanic of the Valley (Ohio) road.

Indianapolis, Decatur & Springfield.—Mr. F. L. Peck is Acting Superintendent, to fill vacancy caused by resignation of Superintendent E. H. Goodrich.

Lehigh Valley.—Mr. H. E. Packard, heretofore Superintendent of New Jersey Division, has been chosen Vice-President; and Jas. I. Blakeslee, heretofore Superintendent of Mahanoy Division, has been made Superintendent of the coal branches.

Louisiana Western.—Superintendent Geo. W. Polk, having resigned, W. Irwin has been appointed as his successor.

Memphis & St. Louis.—Mr. C. H. Hudson has been appointed General Manager, in place of Mr. C. F. Hatch. Mr. Hudson for some time past has been Superintendent of the Trans-Ohio lines of the Baltimore & Ohio.

Pittsburg, Bradford & Buffalo.—This is the new name of the Enneton Shippensville & Clarion; Foxburg, St. Petersburg & Clarion; and Foxburg, Kane & Bradford roads, which have been consolidated.

Rochester & Pittsburg.—Mr. J. P. Hovey has been appointed Master Mechanic in place of Mr. A. J. Rollins, resigned.

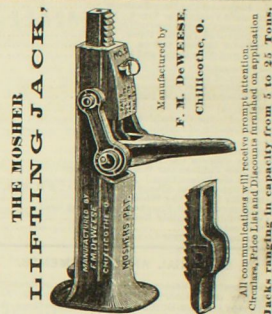
New York & New England.—Mr. J. T. McMann has resigned as Superintendent of the Western Division. He has been connected with the road for many years.

Northern Pacific.—Gen. Herman Haupt has been appointed General Manager, in place of Mr. H. E. Sargent, resigned.

New York Central & Hudson River.—Mr. James Tillaghast, General Superintendent of the lines west of Albany and Troy, has been appointed Assistant to the President. Mr. John M. Toucey, General Superintendent of the lines south of Albany and Troy, has been appointed General Superintendent of the entire main line and branches. Mr. William Buchanan, Superintendent of Motive Power of the Hudson River and Harlem Divisions, has been appointed Superintendent of Motive Power of the entire main line and branches. Mr. C. M. Bissell, Superintendent of the Harlem Division, has been appointed Superintendent of both the Hudson River and Harlem Divisions. The offices of each are as Grand Central Depot, N. Y.

Texas & Pacific.—Mr. H. M. Hoxie, now Vice-President and General Superintendent of the International & Great Northern, has been elected General Superintendent, in place of Mr. Geo. Noble.

WANTED.—A situation as foreman painter in a railroad car repair shop, where steady employment can be had. The applicant is thoroughly competent, and can give satisfactory references. Address NATIONAL CAR-BUILDER, 5 Dey street, New York.



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U. S. Patent No. 140,374, dated Jan. 13, 1874, for bolting machines, grants as one of the claims a link swinging past a center, to operate side hammers, or dies, twice in each revolution of the counter shaft, and I hereby give notice that Messrs. S. C. Forsyth & Co., of Manchester, N. H., are the only licensed builders in the United States to make and sell these machines, and I would caution all persons not to purchase bolting machines having this motion of any one else under penalty of legal steps being taken to secure my rights.

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 LEHIGH VALLEY RAILROAD CO., L. Chamberlin, Purchasing Agent, Philadelphia, Pa.
 NORTHERN RAILROAD OF CANADA, F. W. Cumberland, Superintendent, Toronto, Ont.
 NAUGATUCK RAILROAD CO., G. W. Beach, Superintendent, Waterbury, Conn.
 PHILADELPHIA, WILMINGTON & BALTIMORE RAILROAD CO., S. A. Hodgman, Superintendent of Motive Power, Wilmington, Del.
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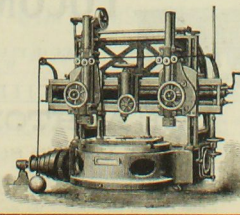
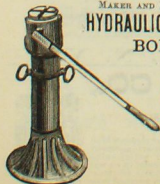
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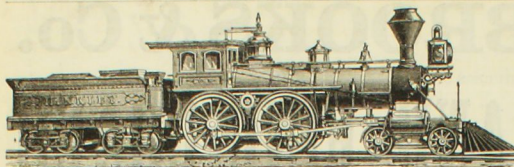
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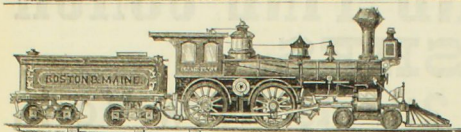
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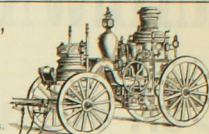
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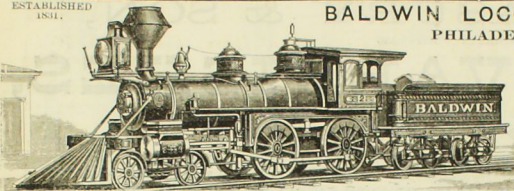
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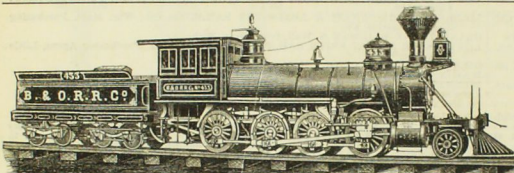
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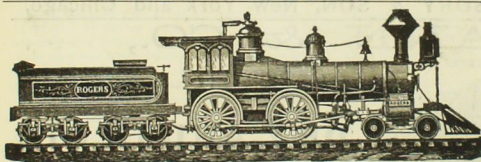
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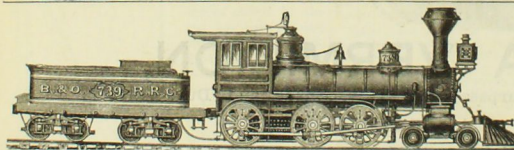
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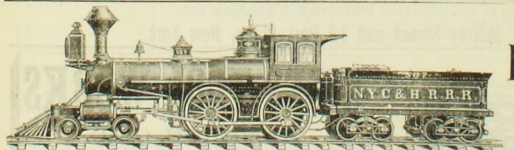
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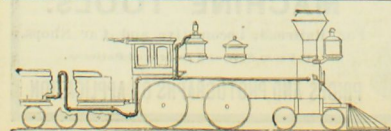
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[May, 1881.]

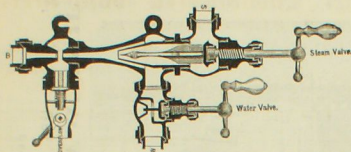
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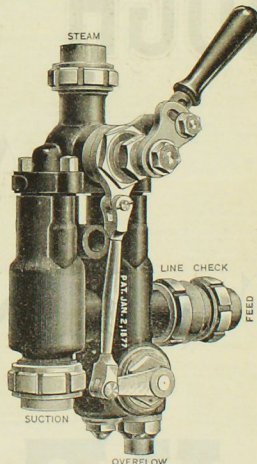
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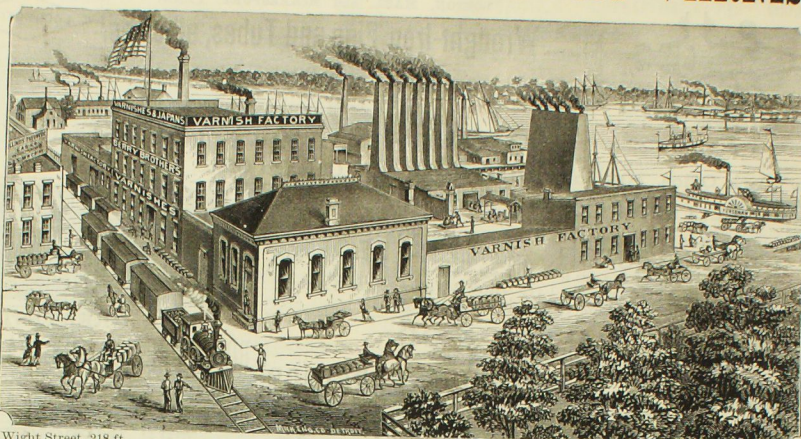
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Railroad.		Master-Mechanic.		Master Car-Builders.		Residence.	
Illinois & St. Louis	J. H. Smith	J. H. Smith	Bellefonte, Pa.	New York, Penn. & Ohio	N. Wright	W. H. Hughes	Cleveland, O.
Indiana & St. Louis	Charles Rothe	E. St. Louis, Mo.	Belleville, Ill.	New York, Penn. & Ohio	W. H. Hughes	W. J. Smith	Kent, Ohio
Indianapolis & Springfield	Pulsak Leeds	Charles Leeds	Leavenworth, Kan.	New York, Penn. & Ohio	William Hill	W. J. Humes	Gallion, O.
Indianapolis, Peru & Chicago	John McKenna	John McKenna	Peru, Ind.	New York, Penn. & Ohio	W. H. Hughes	W. J. Smith	Kent, Ohio
Indianapolis & St. Louis	A. A. Sullivan	Geo. H. Pratt	Monroeville, Pa.	New York, Penn. & Ohio	W. H. Hughes	W. J. Smith	Kent, Ohio
Indiana, Bloomington & Western	C. A. Thompson	C. A. Thompson	Urbana, Ill.	New York, Providence & Boston	W. H. Anderson	Geo. Wilson	Dayton, O.
Intercolonial & Great Northern	H. A. Whittier	H. A. Whittier	Palmetto, Tex.	Northern Central	W. H. Anderson	Geo. Wilson	Providence, R. I.
Iron	Perry Scott	Clem Rosling	Ironton, O.	Northern Central	W. H. Anderson	Geo. Wilson	Providence, R. I.
J							
Jacksonville, Pensacola & Mobile	Jas. D. Hollister	Jas. D. Hollister	Tallahassee, Fla.	Northern Central	W. H. Anderson	Geo. Wilson	Providence, R. I.
Jeffersonville, N. West. & S. East	B. J. Miller	B. J. Miller	Jacksonville, Fla.	Northern Central	W. H. Anderson	Geo. Wilson	Providence, R. I.
Joliet	T. J. Buttery	T. J. Buttery	Irland, Kan.	Northern Central	W. H. Anderson	Geo. Wilson	Providence, R. I.
Junction & Brookwater	J. A. Maczure	J. A. Maczure	Irland, Kan.	Northern Central	W. H. Anderson	Geo. Wilson	Providence, R. I.
K							
Kansas City, Fort Scott & Gulf	J. S. McCrory	A. N. Montier	Kansas City, Mo.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
Kansas City, St. Joe & Conn. Bluff	F. A. Chas.	Thos. Aylesbury	Kansas City, Mo.	Ohio Central	J. F. Franck	J. F. Franck	Peoria, Ill.
Kansas Pacific	Wm. McCall	Wm. McCall	Leavenworth, Kan.	Ohio & Mississippi	J. F. Seelcher	J. F. Seelcher	Vincennes, Ind.
Kansas Pacific	John Mackenzie	T. B. Roberts	Leavenworth, Kan.	Ohio & Mississippi	J. F. Seelcher	J. F. Seelcher	Vincennes, Ind.
Kearney Valley Division	James Long	Armstrong	Ellic, Kan.	Cincinnati Division	John Thumser	John Thumser	Aurora, Ind.
Kenosha & Ill. Division	R. McDonald	Wm. Ogil	Ellic, Kan.	Old Colony	J. E. Kelly	J. E. Kelly	St. Paul, Minn.
Denver Division	R. McDonald	Wm. Ogil	Ellic, Kan.	Old Colony	J. E. Kelly	J. E. Kelly	St. Paul, Minn.
Kentucky & Lincoln	R. Ledyard	J. L. Hackathorn	Covington, Ky.	Old Colony	J. E. Kelly	J. E. Kelly	St. Paul, Minn.
L							
Lake Erie & Western	H. L. Cooper	H. L. Cooper	Lafayette, Ind.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
Lake Erie & Western	Geo. Thompson	Wm. Currier	South Point, N. Y.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
Lake Shore & Michigan Southern	Geo. W. Stevens	Frank O. Bray	South Point, N. Y.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
Lake Shore & Michigan Southern	Geo. W. Stevens	Frank O. Bray	South Point, N. Y.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
Lake Erie & Western	H. L. Cooper	H. L. Cooper	Lafayette, Ind.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
Lake Erie & Western	Geo. Thompson	Wm. Currier	South Point, N. Y.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
Lake Erie & Western	Geo. W. Stevens	Frank O. Bray	South Point, N. Y.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
Lake Erie & Western	H. L. Cooper	H. L. Cooper	Lafayette, Ind.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
Lake Erie & Western	Geo. Thompson	Wm. Currier	South Point, N. Y.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
Lake Erie & Western	Geo. W. Stevens	Frank O. Bray	South Point, N. Y.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
Lake Erie & Western	H. L. Cooper	H. L. Cooper	Lafayette, Ind.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
Lake Erie & Western	Geo. Thompson	Wm. Currier	South Point, N. Y.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
Lake Erie & Western	Geo. W. Stevens	Frank O. Bray	South Point, N. Y.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
Lake Erie & Western	H. L. Cooper	H. L. Cooper	Lafayette, Ind.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
Lake Erie & Western	Geo. Thompson	Wm. Currier	South Point, N. Y.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
Lake Erie & Western	Geo. W. Stevens	Frank O. Bray	South Point, N. Y.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
Lake Erie & Western	H. L. Cooper	H. L. Cooper	Lafayette, Ind.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
Lake Erie & Western	Geo. Thompson	Wm. Currier	South Point, N. Y.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
Lake Erie & Western	Geo. W. Stevens	Frank O. Bray	South Point, N. Y.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
Lake Erie & Western	H. L. Cooper	H. L. Cooper	Lafayette, Ind.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
Lake Erie & Western	Geo. Thompson	Wm. Currier	South Point, N. Y.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
Lake Erie & Western	Geo. W. Stevens	Frank O. Bray	South Point, N. Y.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
Lake Erie & Western	H. L. Cooper	H. L. Cooper	Lafayette, Ind.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
Lake Erie & Western	Geo. Thompson	Wm. Currier	South Point, N. Y.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
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Lake Erie & Western	H. L. Cooper	H. L. Cooper	Lafayette, Ind.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
Lake Erie & Western	Geo. Thompson	Wm. Currier	South Point, N. Y.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
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Lake Erie & Western	H. L. Cooper	H. L. Cooper	Lafayette, Ind.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
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Lake Erie & Western	Geo. W. Stevens	Frank O. Bray	South Point, N. Y.	Ogdenburg & Lake Champlain	Abraham Klops	A. Klops	Malone, N. Y.
Lake Erie &							

IN FAVOR OF HOPKINS.

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Railroad.	Superintendent.	Purchasing Agent.	Residence.	Railroad.	Superintendent.	Purchasing Agent.	Residence.
Parker & Kansas City	R. C. Moberly		Parker City, Pa.	Savannah & Memphis	G. J. Foreacre		Atlanta, Ga.
Peach Bottom	S. M. Manifold		York, Pa.	Seaboard & Roanoke	J. M. Robinson	J. A. Walton	Baltimore, Md.
Paw Paw & Toledo & South Haven	John Hing		Lawton, Mich.	Sedalia, Warsaw & Southern	G. H. Huntington		San Francisco, Cal.
Pennsylvania	*Frank Thomson	Enoch Lewis	Philadelphia, Pa.	Selma, Rome & Greenville	A. M. Fowles		Selma, Ala.
Pennsylvania	Charles E. Pugh		Altoona, Pa.	Selma & Dalton	J. F. O'Brien		Selma, Ala.
Pennsylvania	*John Kelly		Jersey City, N. J.	Shelbygan & Fond du Lac	E. J. Cuyler		Fond du Lac, Wis.
New York Division	James McCrea		Camden, N. J.	Shenandoah & Allegheny	J. T. Blair		Greenville, Pa.
Amboy Division	L. S. Bucklew		Laurelville, N. J.	Shoos City & Pacific	Edwin McNeill		Missouri Valley, Ia.
Bethlehem Division	F. Wolcott Jackson		Jersey City, N. J.	Skaneateles	J. S. Wattle		Cedar Rapids, Ia.
New Jersey Division	W. F. Lockard		Philadelphia, Pa.	South Carolina	J. P. Hall	F. E. Hall	Shakoles, N. Y.
Philadelphia Division	W. F. Lockard		Harrisburg, Pa.	Southeastern of Canada	J. McNamara	S. B. Picken	Charleston, S. C.
Middle Division	S. M. Prevost		Pittsburg, Pa.	Southern	H. A. Alden		Newport, Vt.
Pittsburg Division	Robert Pitcairn		Harrisburg, Pa.	Southern Pacific	Jas. G. Knapp		Auburn, N. Y.
Tyrone Division	S. S. Blair		Albany City, Pa.	South Pacific Coast	A. C. Bassett	John R. Watson	Fire Grove Furnace, Pa.
Bedford Division	Thos. A. Roberts		Lewisstown, Pa.	Tulare Division	A. D. Wilder		Los Angeles, Cal.
West Pennsylvania Division	E. B. Taylor		Pennacola, Fla.	Southwestern of Georgia	W. G. Bowen		Oakland, Cal.
Lewistown Division	J. B. Hutchinson		Peoria, Ill.	Southwestern of Kentucky	W. G. Raoul		San Francisco, Cal.
Pensacola & Selma	Geo. Nason	G. R. Cobleigh	Peoria, Ill.	Spartanburg, Union & Columbia	M. Tabler	Jas. Anderson	Harrodsburg, Ky.
Peoria, Decatur & Evansville	*Robert Stewart		Setersburg, Va.	Springfield, Athol & Northeastern	John W. Phelps		Spartanburg, S. C.
Peoria & Springfield	J. R. Hilliard	L. E. Clark	Philadelphia, Pa.	Springfield & Northwestern	E. B. Hyde	E. B. Hyde	Springfield, Mass.
Petersburg	R. Sully	W. S. Wilson	Williamsport, Pa.	Springfield Southern	Wm. Thornburg	G. A. Barnes	Springfield, Ill.
Philadelphia & Atlantic City	Ellis Clark		Columbia, Pa.	Springfield & Fashboro	J. A. Killam		Parisboro, N. S.
Philadelphia & Reading	*J. E. Wootton		Philadelphia, Pa.	Staten Island	John W. Wilber		Towanda, Pa.
Catawissa & Williamsport	D. C. Reinhart	Henry Wood	Philadelphia, Pa.	Stirling Mountain	R. C. Mismar		Tottenburg, N. Y.
Reading & Columbia	Alex. M. Wilson		Williamsport, Pa.	Summit Branch	R. C. Peabody		Sloatsburg, N. Y.
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Philadelphia & Erie	Wm. A. Baldwin		Renovo, Pa.	Syracuse, Chenango & New York	Albert Allen	G. W. B. Cushing	New York, N. Y.
Philadelphia & Erie	J. W. Reynolds		Thomas Crocker	Syracuse, Geneva & Corning	A. H. Gorton	Andrew Beers	Corning, N. Y.
Western Division	E. B. Westfall		Sunbury, Pa.	Tennessee & Pacific	W. J. Thomas		Nashville, Tenn.
Middle Division	Joseph Crawford		Philadelphia, Pa.	Terre Haute & Indianapolis	Col. Josh. A. Hill		Indianapolis, Ind.
Eastern Division	Dan. Haz & W. Barre Div.		Philadelphia, Pa.	Terre Haute & Indianapolis	Joshua Staples	C. R. Fiedle	Terre Haute, Ind.
Philadelphia, Wilmington & Balt.	H. F. Klemmer		Richmond, Va.	Terre Haute & Indianapolis	George Atherton		Terre Haute, Ind.
Philadelphia, New'n & New York	M. E. Talcott	R. H. Duesberry	Richmond, Va.	Terre Haute & Indianapolis	H. M. Borton	F. B. Watson	Terre Haute, Ind.
Piedmont Air-Line	W. A. Green		Richmond, N. C.	Terre Haute & Indianapolis	C. S. Noble	C. C. Commiskey	Marshall, Tex.
Richmond & Danville Div.	M. A. Andrews		Richmond, N. C.	Texas & New Orleans	C. Harris		Marshall, Tex.
Pine River Valley & Evansville	N. J. James		Richmond, N. C.	Texas & Pacific	H. M. Borton		Marshall, Tex.
Pittsburg & Castle Shannon	A. C. Hays		Richmond, N. C.	Texas & Pacific	C. S. Noble		Marshall, Tex.
Pittsburg & Lake Erie	R. W. Jones		Richmond, N. C.	Texas & Pacific	C. Harris		Marshall, Tex.
Pittsburg, Cincinnati & St. Louis	Wm. F. Felton, Jr.	William Mullins	Richmond, N. C.	Texas & Pacific	H. M. Borton		Marshall, Tex.
Pittsburg, Cincinnati & St. Louis	J. W. Caldwell		Richmond, N. C.	Texas & Pacific	C. S. Noble		Marshall, Tex.
Pitts., Cin. & St. Louis Div.	Ralph Peters		Richmond, N. C.	Texas & Pacific	C. Harris		Marshall, Tex.
Col. Cin. & Ind. Cent. Div.	J. J. Miller		Richmond, N. C.	Texas & Pacific	H. M. Borton		Marshall, Tex.
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Cin. & Musk. Valley Div.	Wm. F. Black		Richmond, N. C.	Texas & Pacific	C. Harris		Marshall, Tex.
Little Miami & N. Y.	C. C. Wall		Richmond, N. C.	Texas & Pacific	H. M. Borton		Marshall, Tex.
Pittsburg, Bradford & Buffalo	M. Mandeville		Richmond, N. C.	Texas & Pacific	C. S. Noble		Marshall, Tex.
Pittsburg, Ft. Wayne & Chicago	J. D. Lavay	William Mullins	Richmond, N. C.	Texas & Pacific	C. Harris		Marshall, Tex.
Pittsburg, Ft. Wayne & Chicago	J. C. E. Gorman		Richmond, N. C.	Texas & Pacific	H. M. Borton		Marshall, Tex.
Eastern Division	George S. Griscom		Richmond, N. C.	Texas & Pacific	C. S. Noble		Marshall, Tex.
Western Division	C. D. Gorman		Richmond, N. C.	Texas & Pacific	C. Harris		Marshall, Tex.
Pittsburg & Western	J. R. Bonner		Richmond, N. C.	Texas & Pacific	H. M. Borton		Marshall, Tex.
Pittsburg, Titusville & Buffalo	Thos. H. Wilson	John L. Awi	Richmond, N. C.	Texas & Pacific	C. S. Noble		Marshall, Tex.
Pittsburg, Titusville & Buffalo	J. M. Ryers		Richmond, N. C.	Texas & Pacific	C. Harris		Marshall, Tex.
Port Dover & Lake Huron	A. B. Atwater		Richmond, N. C.	Texas & Pacific	H. M. Borton		Marshall, Tex.
Port Royal & Augusta	R. G. Fleming		Richmond, N. C.	Texas & Pacific	C. S. Noble		Marshall, Tex.
Portland & Ogdensburg	Jonas Hamilton	Jonas Hamilton	Richmond, N. C.	Texas & Pacific	C. Harris		Marshall, Tex.
Portland & Rochester	P. P. Prescott, Jr.		Richmond, N. C.	Texas & Pacific	H. M. Borton		Marshall, Tex.
Princeton, Frederick & Pied't	Charles Kennedy		Richmond, N. C.	Texas & Pacific	C. S. Noble		Marshall, Tex.
Poughkeepsie, Hartford & Boston	A. W. Cable		Richmond, N. C.	Texas & Pacific	C. Harris		Marshall, Tex.
Prism & Edwards Island	L. B. Archibald	L. B. Archibald	Richmond, N. C.	Texas & Pacific	H. M. Borton		Marshall, Tex.
Prospect Park & Onondaga	R. Schermerhorn		Richmond, N. C.	Texas & Pacific	C. S. Noble		Marshall, Tex.
Providence & Springfield	William Tinkham	William Tinkham	Richmond, N. C.	Texas & Pacific	C. Harris		Marshall, Tex.
Providence & Worcester	W. E. Chamberlain		Richmond, N. C.	Texas & Pacific	H. M. Borton		Marshall, Tex.
Providence, Warren & Bristol	Waterman Stone		Richmond, N. C.	Texas & Pacific	C. S. Noble		Marshall, Tex.
Quebec, Mont. O'H & Occidental	L. A. Steele	W. E. Blumhart	Montreal, Can.	Texas & Pacific	C. Harris		Marshall, Tex.
Quebec Central	A. Steele		Montreal, Can.	Texas & Pacific	H. M. Borton		Marshall, Tex.
Queen Anne & Kent County	H. H. Irwin		Montreal, Can.	Texas & Pacific	C. S. Noble		Marshall, Tex.
Quincy, Missouri & Pacific	J. Schermerhorn		Montreal, Can.	Texas & Pacific	C. Harris		Marshall, Tex.
Raleigh & Augusta Air-Line	J. C. Winder		Montreal, Can.	Texas & Pacific	H. M. Borton		Marshall, Tex.
Raleigh & Gaston	J. C. Winder		Montreal, Can.	Texas & Pacific	C. S. Noble		Marshall, Tex.
Rhinbeck & Connecticut	J. H. Jones		Montreal, Can.	Texas & Pacific	C. Harris		Marshall, Tex.
Richmond & Chesapeake	R. T. Douglas	R. S. Crouch	Montreal, Can.	Texas & Pacific	H. M. Borton		Marshall, Tex.
Richmond & Allegheny	*Decatur Atwell		Montreal, Can.	Texas & Pacific	C. S. Noble		Marshall, Tex.
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Rock Island & Peoria	Eben Hilkey		Montreal, Can.	Texas & Pacific	H. M. Borton		Marshall, Tex.
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Rome, Watertown & Ogdensburg	G. W. B. Cushing		Montreal, Can.	Texas & Pacific	C. Harris		Marshall, Tex.
Rumford & Buckfield	O. Hayford		Montreal, Can.	Texas & Pacific	H. M. Borton		Marshall, Tex.
Scioto Valley	Joseph Robinson		Montreal, Can.	Texas & Pacific	C. S. Noble		Marshall, Tex.
Scioto Valley	Wallace Haycock	C. H. Cory	Montreal, Can.	Texas & Pacific	C. Harris		Marshall, Tex.
St. Croix & Penoscoet	Thos. Reynolds	Thos. Reynolds	Montreal, Can.	Texas & Pacific	H. M. Borton		Marshall, Tex.
St. Lawrence & Ottawa	R. McLaughlin		Montreal, Can.	Texas & Pacific	C. S. Noble		Marshall, Tex.
St. Johns	W. H. Churchill		Montreal, Can.	Texas & Pacific	C. Harris		Marshall, Tex.
St. John & Indian River	H. D. McLeod		Montreal, Can.	Texas & Pacific	H. M. Borton		Marshall, Tex.
St. John & Notre	A. B. Jewett		Montreal, Can.	Texas & Pacific	C. S. Noble		Marshall, Tex.
St. Johnsbury & Lake Champlain	F. J. Bernard		Montreal, Can.	Texas & Pacific	C. Harris		Marshall, Tex.
St. Joseph & Des Moines	L. D. Arthur		Montreal, Can.	Texas & Pacific	H. M. Borton		Marshall, Tex.
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St. Joseph & Western	W. W. Walker		Montreal, Can.	Texas & Pacific	C. Harris		Marshall, Tex.
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St. Louis, Keokuk & Northwest	E. B. Sauney	John A. Blood	Montreal, Can.	Texas & Pacific	C. S. Noble		Marshall, Tex.
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St. Louis, Salem & Little Rock	J. E. Williams, Jr.		Montreal, Can.	Texas & Pacific	H. M. Borton		Marshall, Tex.
St. Paul & Duluth	J. S. Hill		Montreal, Can.	Texas & Pacific	C. S. Noble		Marshall, Tex.
St. Paul, Minneapolis & Manitoba	E. B. Wakeman		Montreal, Can.	Texas & Pacific	C. Harris		Marshall, Tex.
St. Paul & Duluth	Joshua Johnson		Montreal, Can.	Texas & Pacific	H. M. Borton		Marshall, Tex.
St. Paul, Minneapolis & Manitoba	H. C. Whiting	N. W. Merrill	Montreal, Can.	Texas & Pacific	C. S. Noble		Marshall, Tex.
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San Rafael & San Quentin	H. S. Haines		Montreal, Can.	Texas & Pacific	H. M. Borton		Marshall, Tex.
Savannah, Florida & Western	S. Pendergast	W. B. McKee	Montreal, Can.	Texas & Pacific	C. S. Noble		Marshall, Tex.
Savannah, Florida & Western			Montreal, Can.	Texas & Pacific	C. Harris		Marshall, Tex.
Savannah, Florida & Western			Montreal, Can.	Texas & Pacific	H. M. Borton		Marshall, Tex.
Savannah, Florida & Western			Montreal, Can.	Texas & Pacific	C. S. Noble		Marshall, Tex.
Savannah, Florida & Western			Montreal, Can.	Texas & Pacific	C. Harris		Marshall, Tex.
Savannah, Florida & Western			Montreal, Can.	Texas & Pacific	H. M. Borton		Marshall, Tex.
Savannah, Florida & Western			Montreal, Can.	Texas & Pacific	C. S. Noble		Marshall, Tex.
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Savannah, Florida & Western			Montreal, Can.	Texas & Pacific	C. S. Noble		Marshall, Tex.
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Savannah, Florida & Western			Montreal, Can.	Texas & Pacific	H. M. Borton		Marshall, Tex.
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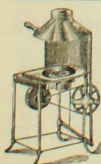
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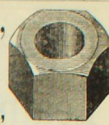
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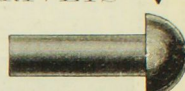
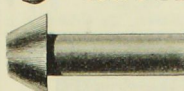
SQUARE
AND
HEXAGON NUTS,
WASHERS,
TANK
AND
COOPERS'
RIVETS.



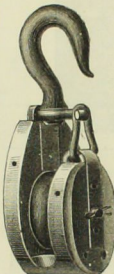
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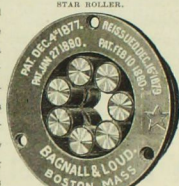


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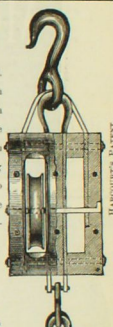


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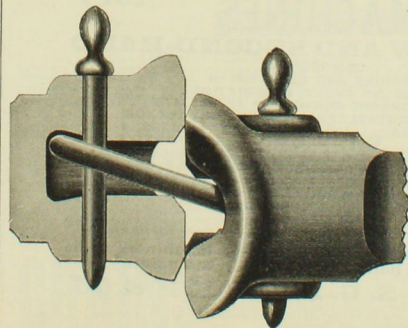
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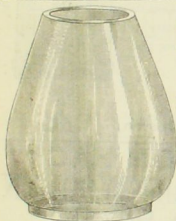
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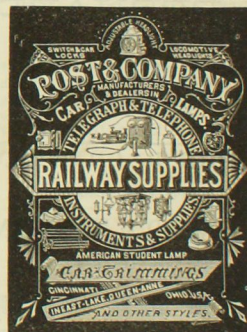
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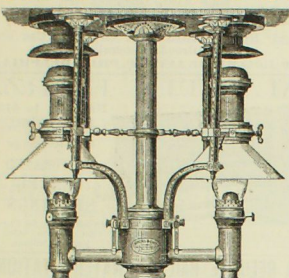
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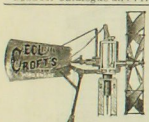


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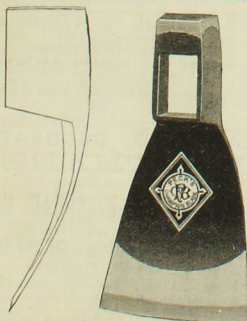
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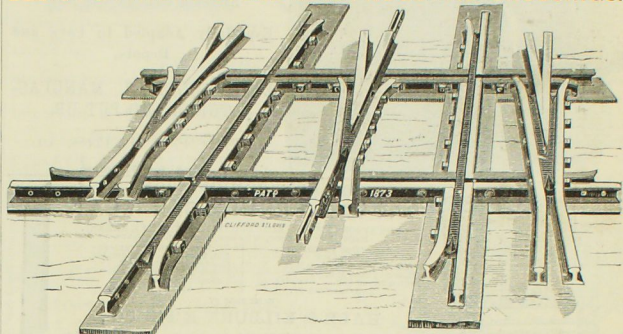
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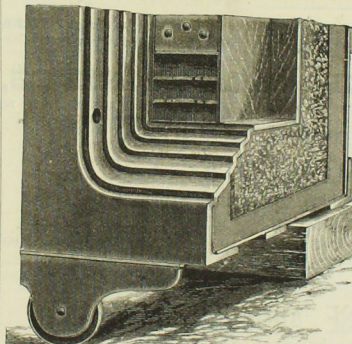
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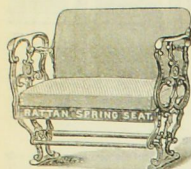
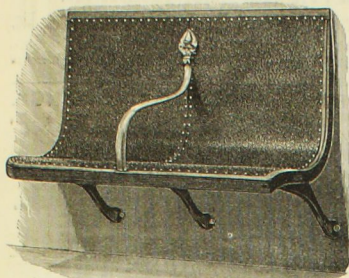
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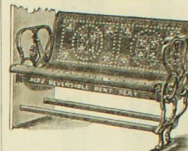
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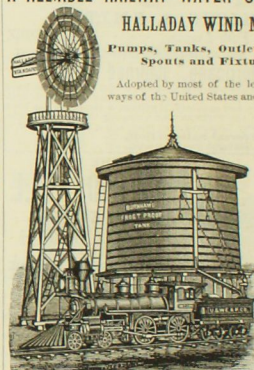
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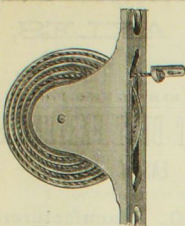
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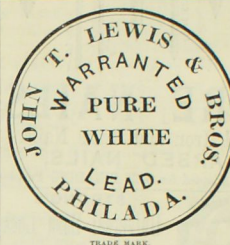
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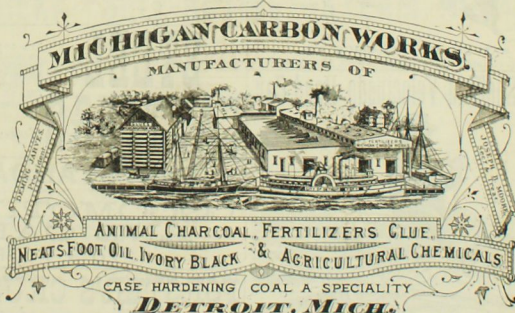
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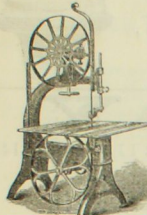
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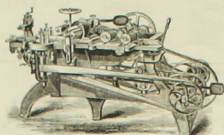
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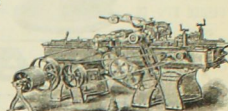
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Planers, Vertical
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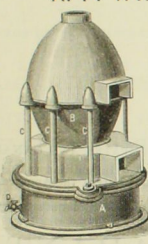
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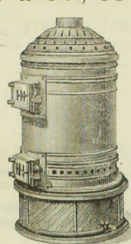
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cover. Letter E. Flue.



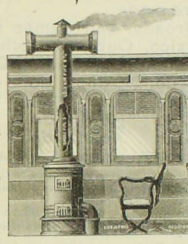
NO. 1.

No. 2.—Stove as set up in car, and will burn either
wood or coal. Letter A. Cast iron. Letter B. Sheet
metal. Letter C. Water tank. Letter D. Jacket
cover. Letter E. Flue. This does not include
the boiler, which is sold separately for
\$10.00. (See also page 10.)



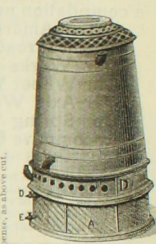
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cover. Letter E. Flue. This does not include
the boiler, which is sold separately for
\$10.00. (See also page 10.)



NO. 3.

No. 4.—Designed for conducting hot air along the
sides of the car, and for heating the car, and for
heating the boiler. Letter A. Cast iron. Letter B. Sheet
metal. Letter C. Water tank. Letter D. Jacket
cover. Letter E. Flue. This does not include
the boiler, which is sold separately for
\$10.00. (See also page 10.)



NO. 4.

It has proved a great success as a heater, on account of the very large volume of air heated.
It also fills the great desideratum so long sought for, perfect ventilation during the summer
by discharging a constant stream of cold air through the registers, keeping car free from dust
and cinders.

EUREKA SELF-ACTING STEAM HAMMER.

TESTIMONIALS.

The following communications are respectfully submitted, a perusal of which will convince any one who has work that
a EUREKA STEAM HAMMER will do, that they cannot afford to be without one or more; they will soon pay for them-
selves by saving on PAY ROLL.

- Jackson & Woodin Mfg Co., Car Builders,
Berwick, Pa. Jan. 12, 1881.
Dear Sir: We have had one of the Eureka Steam Hammers
bought of you, in constant use during the past year, and are
now placing the second one in position. The Eureka does the
work in a manner highly satisfactory, greatly increasing the
capacity of our smith shop, and making such a saving of time
and labor, that we consider it one of the most economical ma-
chines in our works. Our experience with the Eureka Ham-
mer justifies us in giving it our highest recommendation.
Yours truly,
C. H. WOODIN, Pres.
The Jackson & Woodin Mfg Co.
- Harrisburg Car Mfg Co., Harrisburg, Pa. Nov. 11, 1880.
A. H. KINO, Esq., 46 Cortlandt st., N. Y.
Dear Sir: Please ship us one Eureka Steam Hammer, 5 x
10 inches; make the delivery as early as possible.
Respectfully yours,
W. T. HILDRUP, Supt.
- Harrisburg, Pa. Dec. 2, 1880.
A. H. KINO, Esq.,
Dear Sir: Please send us as soon as you can one Eureka
Steam Hammer, 6 1/2 x 24 inches; send as early as possible.
We probably want another, 5 x 10 inches. Hope you have
the above so that you can send it at once.
Respectfully yours,
W. T. HILDRUP, Supt.
- Harrisburg, Pa. Jan. 6, 1881.
A. H. KINO, Esq.,
Dear Sir: You will please send to our Foundry and Machine
Works, Harrisburg, Pa., one of your Eureka Steam Ham-
mers, 5 1/2 x 10 inches. Please send it as early as possible.
Respectfully yours,
W. T. HILDRUP, Supt.
- National Car Spring Co.,
Newark, N. J. Jan. 15, 1881.
Dear Sir: You ask my opinion of the Eureka Steam Ham-
mer. Well, sir, we have one in use at the present, and all I
can say, I would hardly know what to do without it. It does
our work nicely. We hammer iron 4 inches wide, 1 inch
thick, down to 1/4 inch, with one heat, and it does it nicely.
We have had this Hammer about two years, and have had it
running most every day; for my part, I think it is a first-class
Hammer. Hoping this is satisfactory, I remain,
Yours truly,
D. P. CLARK, Supt.
- A. H. KINO, Esq.,
Dear Sir: We have used three Eureka Steam Hammers for
some time, and they work first rate. We sold one, as we
thought it too small for our use; afterward we attempted to
- purchase it back from the party we sold it to, but they would
not part with it: we therefore bought another new one.
Yours truly,
T. F. ROWLAND,
Proprietor, Continental Iron Works.
- North River Iron Works, 206 and 207 West st.,
New York, January, 1881.
A. H. KINO, Esq.,
Dear Sir: We have two Eureka Steam Hammers at work
in our shops, and are entirely satisfied with them, and would
not be without them for a good deal. We recommend them
to any one who does forging.
Yours respectfully,
W. & A. FLETCHER.
- Office of the American Tube Works, Boston, Mass., Jan. 1881.
A. H. KINO, Esq., 46 Cortlandt st., N. Y.
Dear Sir: We have used the Eureka Steam Hammer a long
time, and would not be without it. It is easily worked by
ordinary smith's helper.
Yours respectfully,
E. B. BUCKINGHAM, Pres.
- Sergeant & Cullingworth Co.,
Machine Manufacturers,
382 Second ave., cor. 23d st.,
New York, January, 1881.
A. H. KINO, Esq.,
Dear Sir: We have had a Eureka Steam Hammer in use
about nine months, and find it very useful for our work.
We think there is no better.
Yours respectfully,
SERGEANT & CULLINGWORTH CO.
- Sam'l Hall's Son, Manufacturer of Screw Bolts, Nuts and
Washers, 229 West Tenth st., New York, Jan. 15, 1881.
A. H. KINO, Esq., 46 Cortlandt st., N. Y.
Dear Sir: In reply to yours I would say we have used one
of the Eureka Steam Hammers a long time, forging heads on
large bolts and other general work, which it does exceedingly
well. Am much pleased with it.
Yours truly,
SAM'L HALL'S SON.
- Tubal Cain Iron Works, 127 Water st.,
Brooklyn, January, 1881.
A. H. KINO, Esq.,
Dear Sir: We find the Eureka Steam Hammer does our
work very well. The Square Piston Rod is a most excellent
feature, as it is easily packed and prevents the Hammer from
twisting. We would recommend it in the highest terms to
those requiring a Steam Hammer.
Yours very respectfully,
JOHN ROBERTSON & CO.,
Proprietors, Tubal Cain Iron Works.

Send for Circular and Price List.

ALBERT H. KING, 46 Cortlandt St., New York, U. S. A.

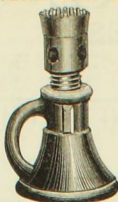
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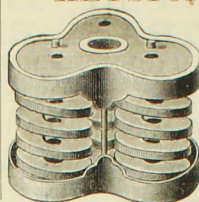


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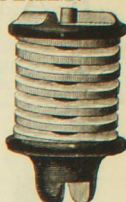
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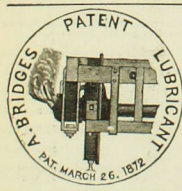
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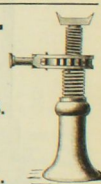
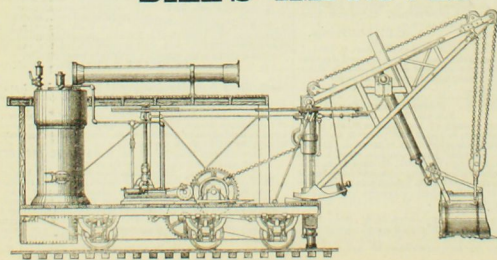
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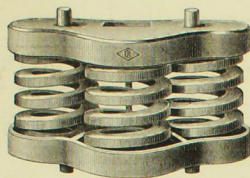
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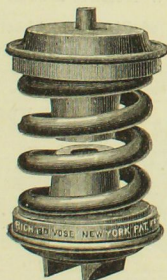
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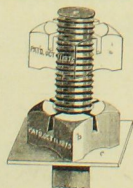
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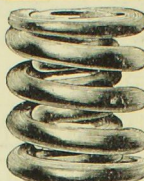
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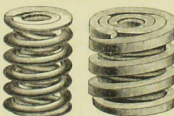
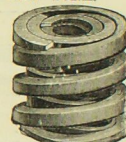
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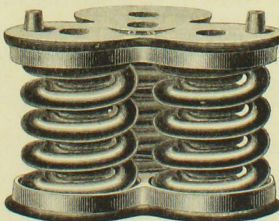
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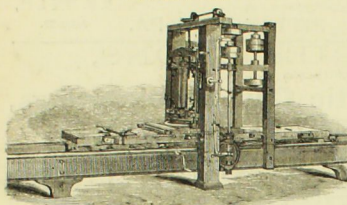
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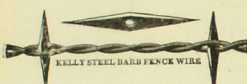
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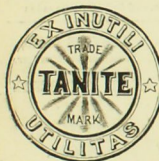


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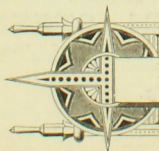
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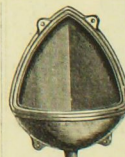
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